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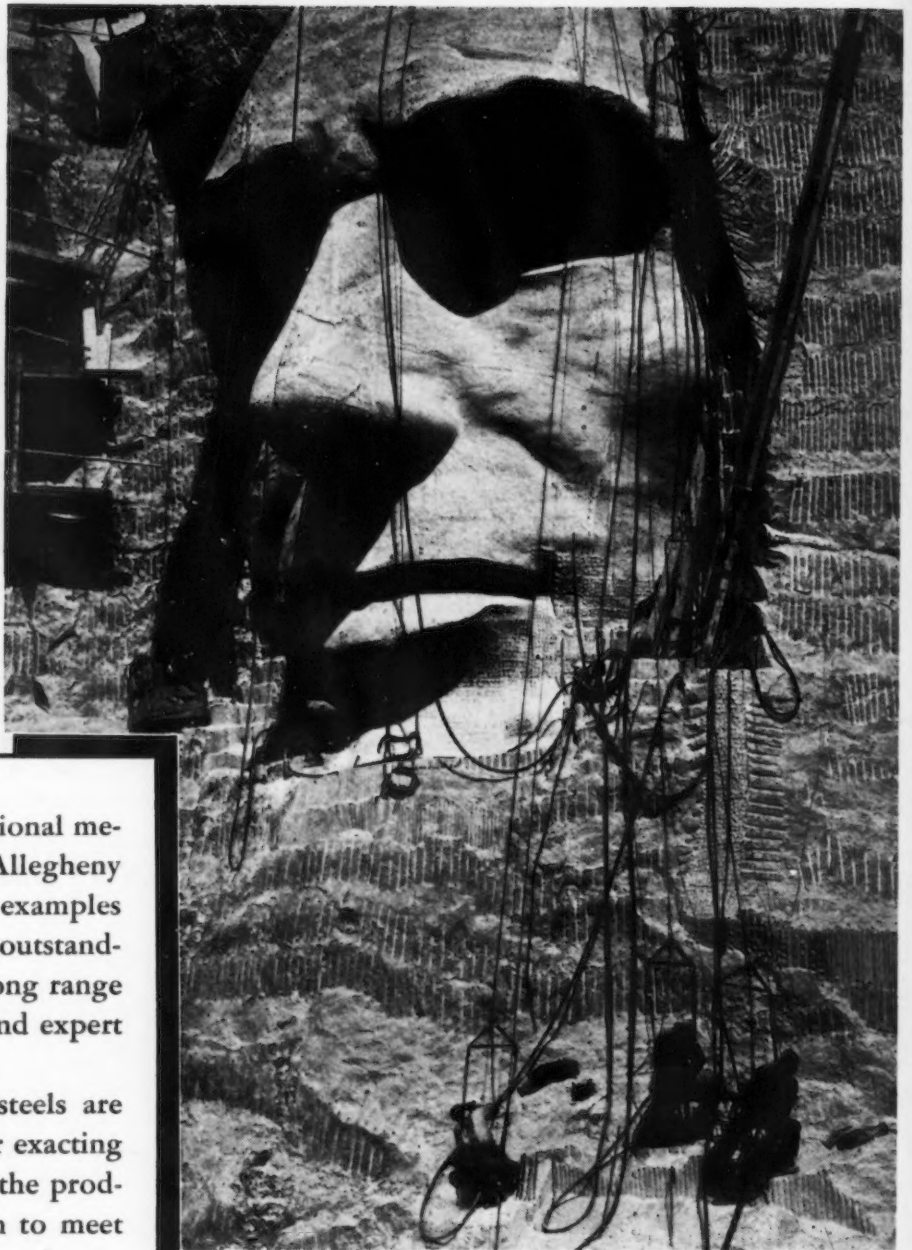
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NOVEMBER 17, 1938

ESTABLISHED 1855

Vol. 142, No. 20

A New Day Dawns

AFTER the past two Presidential elections and the intervening State elections, we heard a good deal about a mandate. That was a new word in the lexicon of American politics.

If any mandate from the people was conveyed by these elections, it was to put 10 million unemployed back to work in private industry.

It was **not** a mandate from the electorate to put these people on Government payroll, except as temporary relief from distress. Certainly not to build up a political relief machine. It was **not** a mandate to redesign the Constitution, **not** to make Democracy safe for the sit-downers, **not** to cripple private employment by abuse and persecution of industry and business.

How well the New Deal Administration carried out or tried to carry out its real and imagined mandates is a matter of record that need not be touched upon. Suffice it to say that after six years of white rabbit pulling, the unemployed in America totaled 11 million, instead of 10.

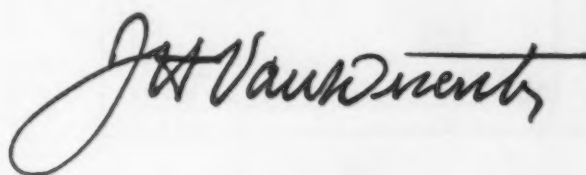
Last week another mandate, or command, was given to the Administration. It was an overwhelming mandate to fish or cut bait. An unmistakable order to forget the imaginary mandates concocted by the "brain trust boys" and to concentrate on the original job of getting the unemployed back in private industry, where they belong. Or else!

From now on, the path of the employer who is anxious to see his business grow and to have employment grow with it will be smoother. For as Democratic Senator Tydings said in his election night victory address: "The task of Government must now be to help business and not to put unnecessary obstacles in its way."

People who have had money to invest and who have been afraid to put it to work for fear of confiscation can now banish that fear. There will be no dictatorship in America. That possibility went out of the window with the failure of the "purge." There will be no more sit-down strikes condoned by Government. That possibility went out of the window with Governor Murphy.

Most encouraging of all the results of the election is the demonstration of the soundness and sanity of the American electorate. It cannot be seduced by unlimited slush funds from the public pork barrel, distracted by white rabbits or regimented by well oiled political machines.

November 8 marked the dawn of a new day of confidence and common sense.



Character and Machine Performance

NOT so very long ago all of the parts made on screw machines were specified as "Screw Stock" and because it cut better, Bessemer screw stock was supplied. More severe service requirements, inability to achieve uniform heat treated hardness, and a certain lack of mechanical dependability forced the production of a free machining steel made by the open hearth practice. Immediately engineers were faced with a choice—when to use Bessemer and when to use open hearth. This question has become increasingly important as service requirements became more severe and more especially as production costs entered prominently into the manufacturing picture. Everybody knew it was cheaper to use Bessemer, but they knew that for certain parts Bessemer didn't give good service. The steel which showed fewer field failures and was more dependable caused production costs to rise. Why didn't someone produce a dependable steel which would cut easily and hold costs down?

The choice of the proper type of material to use has rested upon the fact that Bessemer screw stocks have always been superior in machining quality and inferior in heat treating possibilities and physical character to those screw stocks made by the open hearth process. This has meant that the selection of screw stock for a cer-

tain part has been dependent upon service requirements; a Bessemer being selected if machinability was of prime importance and if the part was not to be heat treated or subjected to severe shock. If it were to be heat treated and service conditions were severe, an open hearth screw stock was specified and a sacrifice in machinability with a consequent comparative increase in production cost was absorbed.

Naturally, to avoid this increased cost, efforts were made to improve the cutting properties of open hearth steels and at the same time to preserve to the highest possible degree their good qualities. First methods embraced a mere duplication of Bessemer analyses usually effected by a rephosphorization and resulfurization process. This method did not effect the expected increase in machinability and resulted in a loss of the properties considered most valuable in open hearth steels.

One of the possible reasons why an open hearth steel, the analyses of which was a duplication of Bessemer, did not prove to be satisfactory, was because of the differences in nitrogen content. An effort was made to produce an open hearth product with a nitrogen content comparable to a Bessemer steel. Research and development are being carried on which will eventually show the merits of the idea.

Effort has been made to increase the sulphur content to about one-fourth of 1 per cent and by claimed improvements in furnace melting and pouring practices to offset the effect of this high sulphur. Comparative tests of the tensile and impact properties will show definitely a loss in these characteristics and in ductility which limits the universality of application.

Efforts to increase the phosphorus content of these steels also met with disapproval because an even greater sacrifice was noted as

the result of rephosphorization than with resulfurization. Accordingly, rephosphorized steels without the sulphur content have suffered the same fate and largely for the same reasons.

Deoxidation practice, rolling practice, rolling and finishing temperatures all play a very important part in fostering what is known as good machinability in steel and have been given considerable attention designed to set up standard practices which will give a maximum machine rating. Cold finishing operations can be controlled to a considerable extent to aid in further improvement by heavy rolling and heavy drafting in the drawing operations. Improvement from these means has not been sufficient to warrant the added expense entailed and mills do not find it possible always to perform this added cold work. At the same time, the results obtained are too limited to warrant consideration in any but relatively isolated cases. None of these are of such a nature as to permit production of a product universal in application for all operations. Besides this, such control of production and special processing are expensive and limited by equipment and individual requirements, all of which bring an economic element into the problem.

Research efforts have been directed along the line of a metallic addition which would effect good cutting char-

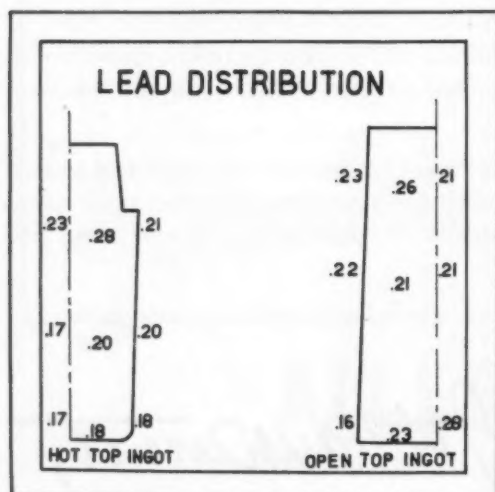


FIG. 1

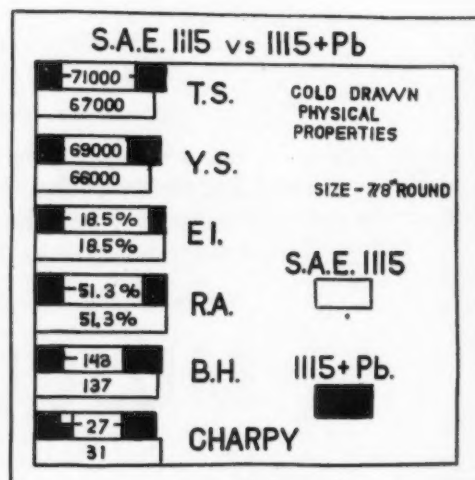


FIG. 2

of Lead Bearing Steels

By **FREDERIC J. ROBBINS**
Bliss & Laughlin, Inc.

acter and not result in a loss of mechanical dependability in any condition; one which would permit excellent response to heat treatment (and the production of which would permit of relatively standard practices which would result in a steel reasonably universal of application). For several years the cutting properties of certain non-ferrous alloys have been improved by additions of small percentages of lead. As nearly as possible the lead fulfilled the requirements outlined above and still were not prohibitive from a cost standpoint. From this came the idea of lead additions to open hearth steels. The whole purpose of such additions, of course, has been the improvement in machining quality with as little as possible or no sacrifice in physical character.

A number of mechanical difficulties were encountered in making the addition of lead in such a manner as to insure its uniform distribution through the mass of the steel. This is due to the fact that lead is not soluble in molten steel, and that the two materials are not miscible. By the special process which has been developed, an emulsion of the lead in the molten steel is formed, which on solidification leaves the lead in a very finely divided state, uniformly dispersed throughout the ingot.

The size of the particles of lead is

so fine as to be sub-microscopic and efforts to determine the size by X-ray have failed because of the small amounts present. About 1 per cent is necessary for the bands to indicate particle size and only about $\frac{1}{4}$ of this amount is present in these steels. No evidence of more than nominal segregation has been found due, principally, to the method by which the additions are made. Laboratories are severely handicapped in their attack upon the metallographic characteristics of the lead in that the particles are so fine. The nature of the occurrence of the lead is such that even with the most powerful microscopes at high magnification it is not possible to resolve any structure of the lead particles. At the same time difficulty has been experienced in finding a satisfactory etchant definitely to show the presence of lead.

To date the most satisfactory metallographic etchant found for this purpose is an aged solution of sodium picrate to which a small amount of sodium sulphide has been added. There is considerable diversity of opinion in the interpretation of samples etched by this means, in that this etchant seems to indicate the presence of lead but not the exact location or distribution. By X-ray examinations and tests of electrical properties it has been definitely shown that the lead does not form a solid solution with iron and there is,

therefore, no alloying effect of the two. Meager results of metallographic examinations have provided relatively little in the way of information or data except to prove definitely that the lead is there and that it is very finely divided and of sub-microscopic size.

There is an effect of the lead upon the McQuaid Ehn grain size in that it has a tendency to make this grain size somewhat finer than that of the base heat of the material to which it has been added. So far

this has not appeared to be detrimental in any way as regards machinability or heat treatment of this material except that it reacts in a way expected for a steel embracing the particular grain size found. Beyond this the lead appears to have no effect metallographically.

Fig. 1 shows results of actual chemical checks made upon several halved ingots of SAE 1115 plus lead at various spots to indicate the uniformity of lead distribution. Figure indicates that there is little tendency on the part of the lead to segregate in any spot, regardless of the type of ingots used—hot top or open top—and indicates a relatively uniform distribution throughout the mass of the ingot which is of course carried over into the bar rolled from that ingot. This effect as mentioned before is due principally to the method in which the lead is added and is, of course, a feature of prime importance as it makes for uniform machinability and for a minimized effect upon physical character of that steel.

Of a great deal of importance to us are the physical properties of these materials in the unheat-treated and heat-treated conditions. It is necessary to discuss these in some detail because this point is of considerable importance in fulfilling one of the original

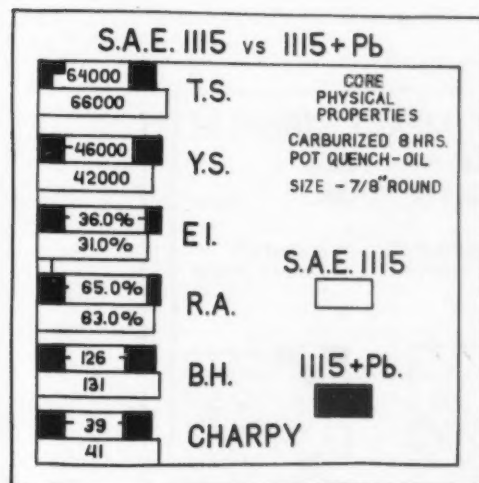


FIG. 3

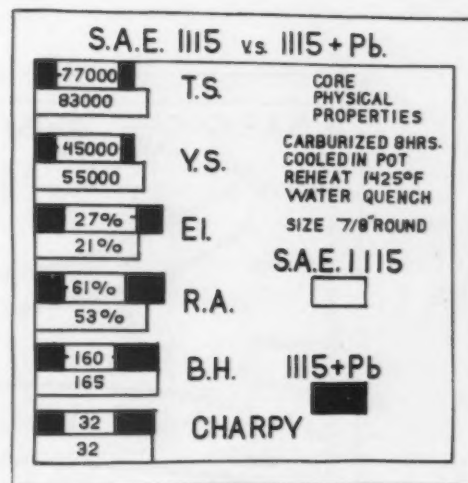
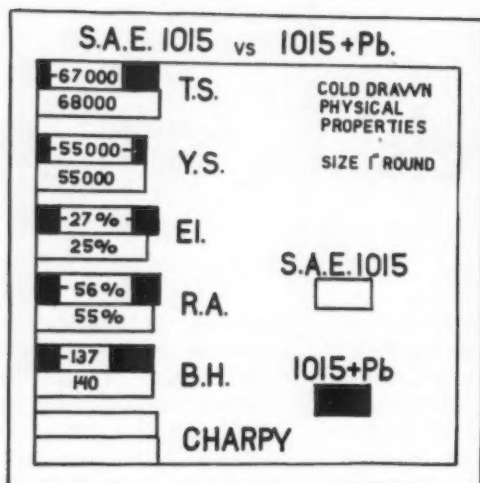


FIG. 4

FIG. 5



requirements set up for this type of material; namely, the production of a free-machining, open hearth steel without a loss of physical properties and mechanical dependability.

A close study of the effect of lead on physical properties has been possible because of the fact that both lead bearing and non-leaded specimens could be obtained from the same heat of steel. Bars for this purpose were rolled from adjacent ingots, a lead addition having been made to one and not the other. This practice which has been used in the preparation of test data gives the benefit of a standard base material, the only major variable between the products of the companion ingots being the lead.

Fig. 2 shows the cold drawn physical properties of SAE 1115 versus 1115 plus lead. It is noted that the tensile and yield strengths compare very favorably with a slight edge to the leaded steel. This edge, however, 4000 lb. in tensile and 3000 lb. in yield, is so slight as to be within testing tolerances. The elongation and reduction

of area are identical; Brinell hardness on leaded steel is 143 as compared with 137 on the non-lead bearing steel, as cold drawn, while the Charpy impact is slightly higher for the SAE 1115. Here again these impact values are so close as to cause the differences to be assigned to testing variance.

Fig. 3 shows the physical properties of the same size bar and same analysis material when carburized for eight hours and quenched directly from the pot into oil. Note again how closely the two compare: 2000 lb. difference in tensile, 4000 lb. in yield, 5 per cent in elongation in favor of the lead, 2 per cent in reduction of area in favor of the leaded steels. Brinell slightly softer, and Charpy slightly lower for the leaded steels.

Fig. 4 shows the same steel carburized for eight hours, cooled in the same pot, reheated to 1425 deg. Fahr. and quenched in water. Here in tensile there is 6000 lb. in favor of the standard SAE 1115, 10,000 lb. yield in favor of standard SAE 1115, 6 per

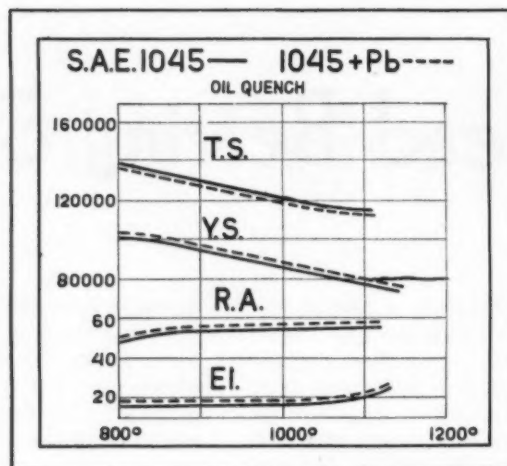


FIG. 6

cent elongation in favor of leaded steel, 8 per cent reduction of area in favor of leaded steel, 5 points lower Brinell and identical Charpy values.

Fig. 5 shows the comparative cold drawn physical properties of SAE 1015 and of the same analysis plus lead on a 1 in. round. Physical properties are almost identical throughout.

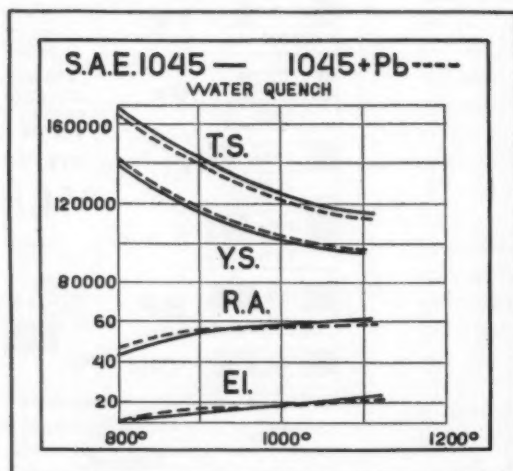
Fig. 6 shows the comparative physical properties of SAE 1045 and 1045 plus lead, companion ingots, rolled at the same time under identical practices. Heat treatment was simple quench into oil and a draw both performed on samples at same time. Here again we note how closely the physical properties compare.

Fig. 7 shows the same steels as Fig. 6 except that they have been quenched in water. Again we find the close comparative values of physical properties.

Fig. 8 shows the comparative impact values of the steels referred to in Figs. 6 and 7, water quenched and oil quenched; both tempered at 1000 deg. Fahr.

Fig. 9 shows the comparative physi-

FIG. 7



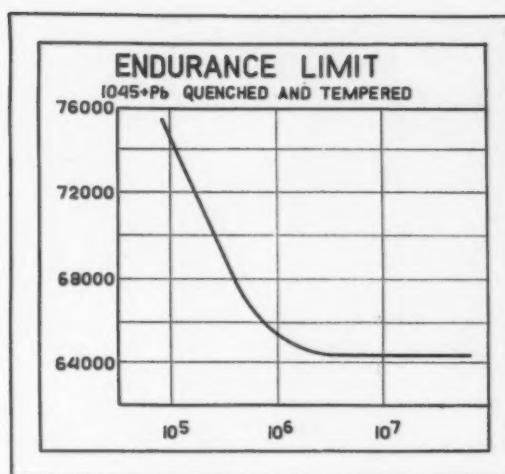
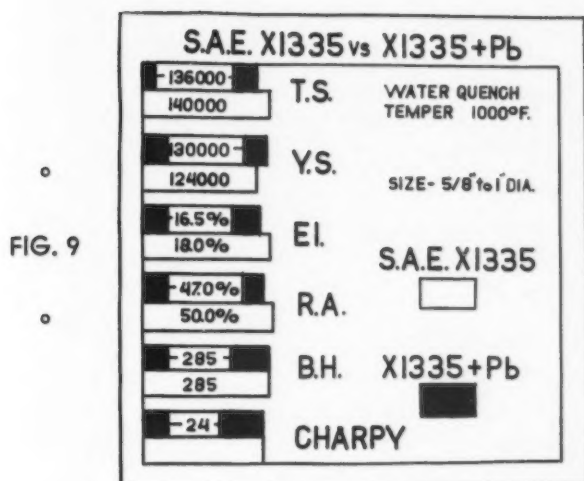
CHARPY IMPACT STRENGTH

SAE 1045

1045 + Pb

WATER QUENCH
TEMPER 1000°FOIL QUENCH
TEMPER 1000°F

FIG. 8



cal properties of SAE X-1335 and X-1335 plus lead. We again note that the differences in physical character are so slight as to be within testing variations.

Figs. 10 and 11 show fatigue values for the leaded 1045 and SAE 1045. The endurance limit is the same for both steels. The only significant difference is the fact that the leaded steel curve approaches the axis less rapidly, indicating its ability to withstand stresses in excess of its endurance limit for a greater number of cycles.

The conclusion reached from a consideration of the test data which have been presented, together with that from numerous other similar tests, is that the addition of lead to any of the standard SAE plain carbon or open hearth screw stocks steel grades results in no significant change in their physical character. Those differences which have been brought out in the tests are felt to be attributable to experimental error or the result of normal variations in chemical and metallurgical characteristics within the

same heat of steel. Even though we consider these slight variations as due solely to the presence of lead (a fact which has not been conclusively demonstrated), the effects are actually so slight as to require no modification in engineering design or in material specification.

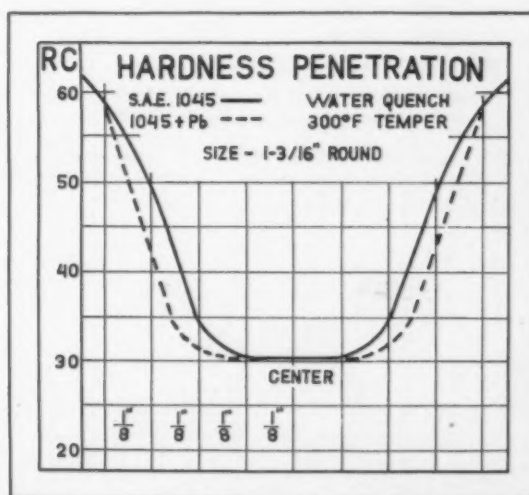
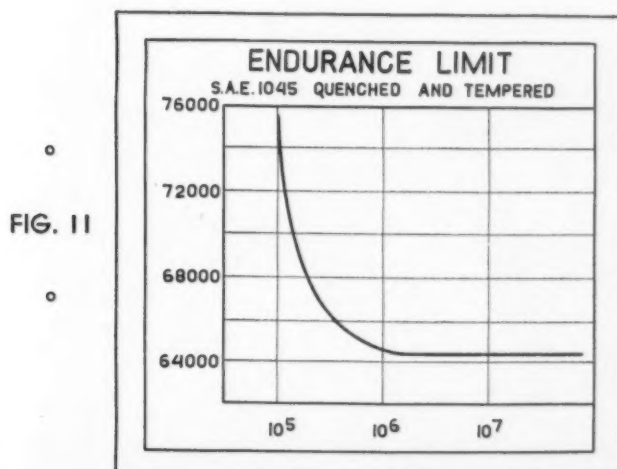
In connection with the heat treatment of these lead bearing steels, field service reports indicate that occasionally their ability to case carburize seems to be slightly retarded. This, it is believed, is due to the fact that the lead causes modifications in the characteristics determined by the McQuaid-Ehn grain size test, as mentioned above. This, however, can safely be compensated for by slight variations in temperature of carburizing with no danger to the part.

In connection with the steels of higher carbon content which are to be simply quenched and drawn, the leaded steel shows a tendency to form a slightly more adherent scale than do those of like analyses containing no lead. Tests have shown that in general

this can be overcome by the control of furnace atmosphere which is a relatively simple matter in the gas fired furnace. It has also been found that in an electric furnace an artificial atmosphere produced by the presence of a small amount of carbon tetrachloride or coke satisfactorily removes this scale or retards its formation and eliminates a loss in hardness which would result if a heavy scale were left adhering to the piece when quenched.

Beyond this, laboratory experiments and production experience have shown no significant differences in the various processes of heat treatment necessary to produce comparable results in lead bearing and non-lead bearing material.

As regards the hardenability, Fig. 12 shows a comparison of the hardness penetration of 1045 leaded and non-leaded bars from companion ingots, water quenched and drawn at 300 deg. Fahr. The hardness readings were taken 1/8 in. apart and indicate a very close correlation between the two. The same is found in the com-



parison of the same steels water quenched and tempered at 1000 deg. Fahr., as shown in Fig. 13.

A critical examination of these figures will indicate that lead bearing steels are slightly more shallow hardening than non-lead bearing. Such slight variations can usually be compensated for by nominal modifications in chemistry or heat treating practices.

A recapitulation of the information shown here along with the many other tests whose results are identical or closely comparable to those shown,

involved. One shop can run a certain steel at a much higher rate of production than another and yet produce excellent results. The old argument of heavy feeds and slow speeds versus light feeds and higher speeds; equipment available, its age and condition of repair; operating skill and a hundred others materially complicate the whole problem.

The following illustrations are results of production tests run in manufacturing plants or screw machine jobbing houses where no especial features

per min., net production of 156 parts per hr. at a cost per part of \$0.028. Against this let us compare the same part made from 1115 plus lead, on the same machine using a speed of 236 ft. per min., a net production of 288 parts per hr., total cost of part \$0.023. This represents a saving of 18 per cent.

Another typical part is a spur gear used on a washing machine, formerly made of X-1335 at 134 ft. per min., giving a production of 150 parts per hr. at a cost of \$0.031 per part.

FIG. 13

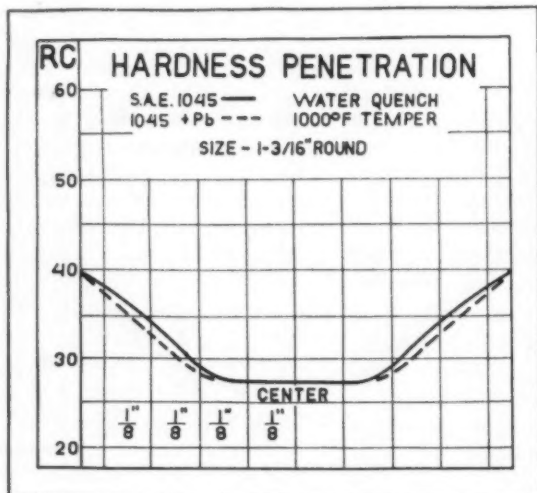
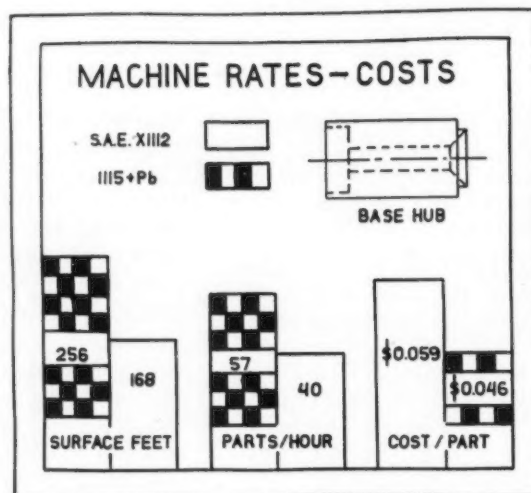


FIG. 14



seem to be sufficient evidence that carbon or screw stock steels containing about $\frac{1}{4}$ of 1 per cent of lead added to present standard SAE analyses can be handled in almost the same production procedures as are true for those same grades not containing lead and that as a result of heat treatment physical properties and mechanical dependability of the same order can be anticipated.

This means that the addition of lead to open hearth steels has fulfilled one of the original conditions which were enumerated at the outset for a free-machining material to embrace, namely the retention of good physical character.

Now, briefly, let us inquire into the ability of leaded steels to meet the other requirements set up, namely, its comparative machinability.

The choice of evidence illustrating the relative machinabilities of materials is always a difficult one to make. So many variables have a direct or indirect effect upon the production procedures, speeds and feeds that it is an impossibility to quote figures which will be applicable for the same part in any set up other than the one directly

were incorporated into the tests. Every effort was made to prevent any injection of prejudice which might influence the results in any way. Identical production procedures were employed in each individual comparative test. It is true that procedures used in other shops might have resulted in different figures and consequently either greater or less savings in part cost. It is not felt that this invalidates the test, as regards the production of the part involved, particularly, since the noted savings actually appeared on the job cost sheet.

Fig. 14 shows the comparative production of a base hub made from SAE X-1112, high sulphur Bessemer screw stock, originally at 168 ft. per min., a net production of 40 parts per hr. and a total cost per part of \$0.059. Compare this to the same part run on the same machine using heavier feeds and higher speeds at a surface speed of 256 ft. per min., a net production of 57 parts per hr. and a total cost of \$0.046 per part, or a saving in part cost of 22 per cent.

Fig. 15 shows a bushing used in the automotive field which formerly was made of SAE X-1314 at 128 ft.

Against this a lead-bearing X-1335 steel was run at 187 ft. per min., giving a net production of 214 parts per hr., and a total cost of \$0.029, showing a saving of 6.4 per cent in the cost of this part. This is shown in Fig. 16.

All three of these parts were run in sufficiently large quantities to show a very definite increase in tool life as well as to make certain that the machines would continue to run on a production basis at this rate. Tool life indications have been sufficient to warrant an assumption that tool expenses will show a decided decrease in the operations necessary for relatively high production of parts of this type. Certain jobs have shown increases in tool life as great as 200 per cent. Others, of course, have not shown nearly this much increase but have been large enough to be considered a significant factor in the reduction of general tool expense for any job.

It should be mentioned here that in a number of instances it has been found advantageous from the standpoint of tool life and part finish to make some small adjustments of clearances and rake angles in grinding tools when running leaded steels. This

has not been definite enough or general enough to permit the presentation of data. Usually the machine operator can "feel his way" to the most satisfactory machine set up on any given job.

Innumerable examples could be cited of other jobs on which leaded steels (plain carbon open hearth, open hearth screw stock and Bessemer grades) have been substituted for a variety of standard grades and on all of which they have shown a definite improvement in part character, tool life, and

small size is a possible explanation of the fact that lead is so much more powerful than manganese sulphide in promoting machinability. At the same time these characteristics may be an explanation of its not affecting the physical properties of the steel to which it is added. The effect upon the tools is further explained by the well known lubricating effect of lead as a component part of various bearing materials giving the effect of lubrication or bearing action as the tool passes through the steel. Further

have indicated that these materials exhibit the same general physical and metallurgical characteristics as comparable analyses without lead, and that from this standpoint they can be specified for any parts formerly made of these grades without the lead.

The improvement in machinability is of the same general order as has been previously noted for the leaded open hearth steels. To realize fully the potential machinability provided in these lead bearing Bessemer steels, it is necessary, of course, that adequate

FIG. 15

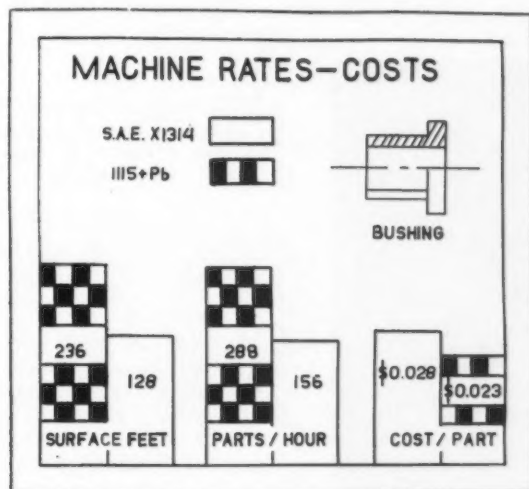
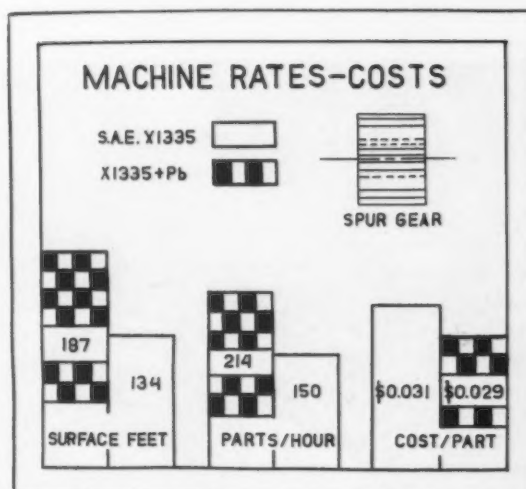


FIG. 16



have increased production sufficiently to effect a considerable saving in part cost.

Explanations, metallurgically, for this effect upon speeds and feeds and tool life, to date are more or less theoretical. The assumption is that these improvements are due to two functions of the lead; one being that because it is present in an emulsified form it serves effectively to break up the continuity of free-ferrite in a manner similar to that performed by manganese sulphide but much more effectively in that it is distributed in much finer particles and more uniformly throughout the mass, and, at the same time, exhibits considerably less tendency towards segregation.

The resulting discontinuity promotes machinability by producing a fine and well broken up chip which minimizes building up around the cutting edge of the tool. Frictional heat is, of course, minimized which results in longer tool life. An even greater consideration is the possibility of higher speeds and heavier feeds made possible by this fact. Nor should the improvement in part finish be overlooked. The uniformity of distribution of lead particles and their extremely

tests in progress at present may add to or subtract from these ideas.

While lead additions were first made to open hearth screw stocks and plain carbon steel grades with the view of developing improved machinability without sacrifice in the physical properties characteristic of open hearth steels, the fact was not overlooked that a comparable improvement in the machinability of Bessemer steels or alloy steels was highly desirable.

There is a large volume of automatic screw machine parts being made, for which the physical characteristics of Bessemer steels are entirely adequate. Many of these parts are intricate in design and involve extensive machine operations in their fabrication. To meet the demands of the fabricator of this class of parts for increased production and decreased finished part cost, leaded Bessemer steels are available with machinability ratings heretofore not approached by any free cutting steel.

The analyses of the base material of these steels, to which the lead has been added in the same amounts as in the open hearth steels noted above, conform to the standard for SAE 1112 and X-1112. Laboratory experiments

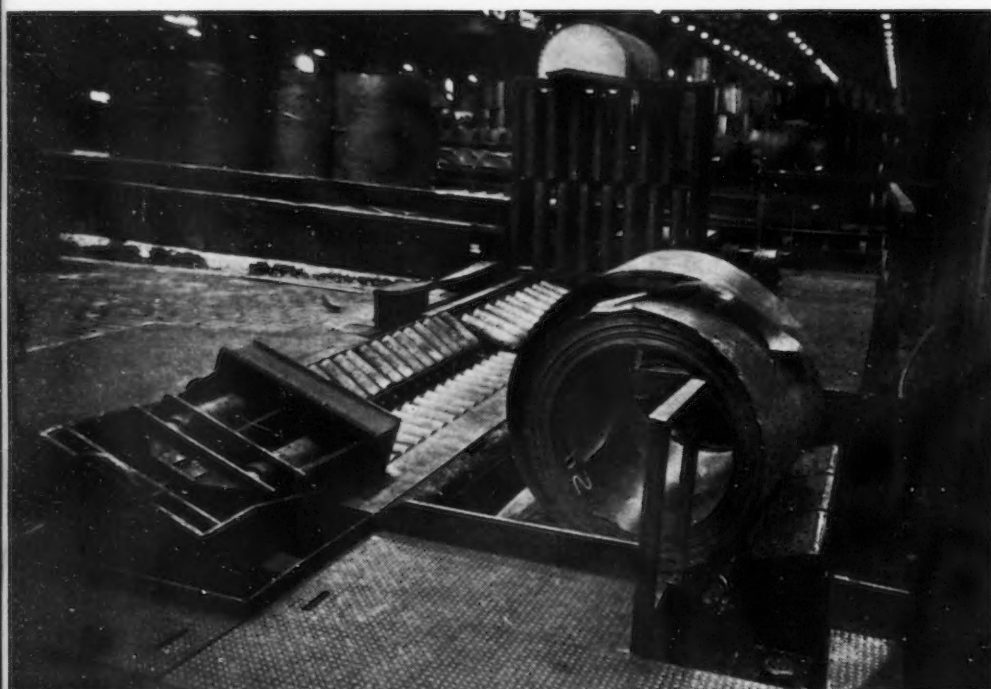
machine equipment be available, which will permit sustained operation with high spindle speeds and heavy feeds.

The development of leaded alloy steels with a lead content such as has been used in the grades previously discussed, is still in the experimental stage. While several different grades of leaded alloy steel have been produced, sufficient test data are not yet available to permit a final judgment as to the merits and possible shortcomings which these steels may have.

It is not the intention of the writer to indicate in any way that lead bearing steels represent a panacea for all machining troubles nor to suggest that they will replace entirely those grades which have so effectively served a great purpose in the industry. The writer does believe, however, that steels with lead are attaining a definite place in material specifications with those now standard. A great service they could be made to perform is the elimination of the many slight and usually unimportant variations from standard analyses for so-called "special jobs" and "special results," the promotion of which has resulted in great difficulty for both steel producer and fabricator.



o o o



ABOVE

FIG. 1—Logan conveyor installation in a large strip steel mill, feeding a battery of continuous pickling units.

o o o

AT LEFT

FIG. 2—Logan side-tilter in same installation, delivering a coil automatically to the unrolling mechanism just ahead of the pickling operation.

o o o

BELOW

FIG. 3—Logan handling equipment at the discharge end of the four pickling units in same steel mill as in Figs. 1 and 2.



o o o

Rolling Along on Industrial Conveyors

By FRANCIS JURASCHEK

Consulting Editor, The Iron Age

CHAPTER 32 in a Series on the Economics of Materials Handling Methods and Equipment

AT first glance the problems of materials handling seem to be so complex that few of these problems appear to have anything at all in common with others. But a simple analysis shows that two facts cover practically all the real essentials of any situation. These facts are the characteristics of the load and the characteristics of the movement. In other words (and this is not intended as a joke) the subject of materials handling consists merely of a consideration of the *materials* to be handled, and of the *handling* of those materials.

But all the possible variations of these two factors (which seem on the surface to include innumerable complications and variations) may be reduced to just five physical characteristics. In so far as any materials handling problem is concerned, all the essential qualities of the load may be expressed in terms of weight, shape and size; and all the essential qualities of the movement may be expressed in terms of direction and speed.

Once this idea is grasped, the apparent complexities of the subject reduce themselves to elementary principles, and it is no longer necessary to think of ore-handling as one problem and the automotive assembly line as an-

other, as regard package handling as essentially different from the progressive machining of an engine block, or the transfer of miscellaneous cargo from ship to rail at a marine terminal as totally unlike the process of converting slabs of steel into coils of rolled strip. Each and every materials handling problem may be converted, for the purposes of engineering and economic analyses, to the five physical factors of weight, shape and size of load, and of the direction and speed of the movement. And, in so reducing the elements of the problem to comparable data, the solution is more than likely to suggest itself without further ado.

Subject, of course, to the special conditions of each problem, it may be said in general that when the movement is intermittent in character the equipment called for is apt to be some form of wheeled, mobile truck, or some form of crane and hoist combination; while, when the movement is regular and constant, over the same path, the equipment called for is apt to be some form of conveyor.

Industrial Conveyors

In certain cases the weight and size of the load are complementary; material is generally heavy because it is big. Now, if the shape is such that a flat surface is presented in the material or its container, sufficient in size to make effective contact with two or more rollers simultaneously, a very

logical means of handling is apt to be the roller type of conveyor. On the other hand, small, irregularly shaped or loose materials probably indicate the use of the belt conveyor, or some one of its variants, the apron, bucket, or drag-link conveyor. Or, if the material is carried on a platform, a skid, or is contained in a box, crate, barrel or drum, and is to go over the same path in a regular, continuous flow, the equipment may be either the roller or the belt conveyor, as other conditions may indicate.

Again, if the material consists of products or parts which may readily be suspended from a hook or sling, or may be carried in a container of any size or shape which may readily be suspended from a hook or sling, an overhead conveyor may be the ideal solution; either of the unit trolley type, or of the continuous chain type.

While it is true, as F. E. Moore says in "Natural Laws Applied to Production," that every materials handling device must be adapted to the load characteristics of the material to be handled, the reduction of these characteristics to the physical factors of weight, size and shape shows that they are essentially few in number, relatively simple in type, and easily met. The really essential factor in a materials handling system is movement, in its two elements of direction and speed. In the materials handling system of whatsoever type may be considered, these two elements are the



FIG. 4—Standard Conveyor equipment handling coils of strip steel into storage in another strip mill.

two essential phases of the principle of continuous flow—the principle which has probably done more to make modern production methods efficient and economical than any other idea of industrial management.

Continuous Flow

It has been said that efficiency and economy both are gained in materials handling when no load is moved by mere muscle that can be moved mechanically. But more than that is re-

quired for true efficiency and true economy. Only when the handling is so planned that rehandling is eliminated, that retrograde movements are done away with, and that the goods movement becomes one, forward-progressing line from the beginning to the end of the work, may the ultimate ideal be attained. And this ideal is summed up in the principle of "continuous flow," to which the conveyor, of all materials handling devices, is best adapted.

This thought may be readily grasped when it is considered that the output of any piece of processing equipment, no matter how efficient it may be in itself, cannot exceed the amount of material which is fed into it in any given period, and taken away from it after the processing work is done. It is therefore of the utmost importance to provide a constant flow of material into such equipment, and likewise to provide a means for swift, positive removal at the discharge end in order to prevent a production hold-up. Any machine or process that is idle sixty minutes during a working day loses exactly an hour's productivity. As an example, consider the modern strip steel mill, where a bottle-neck may readily be found at the continuous strip pickling operation.

Equipment Illustrated

Fig. 1 shows such a condition. Four continuous pickling units, in the background, must be kept supplied constantly with fresh coils of strip steel, without a moment's interruption, if these expensive units are to be worked to full capacity. In this particular mill, Logan Co. conveying and handling equipment accomplishes this desirable condition. Overhead crane service delivers a supply of coils to the

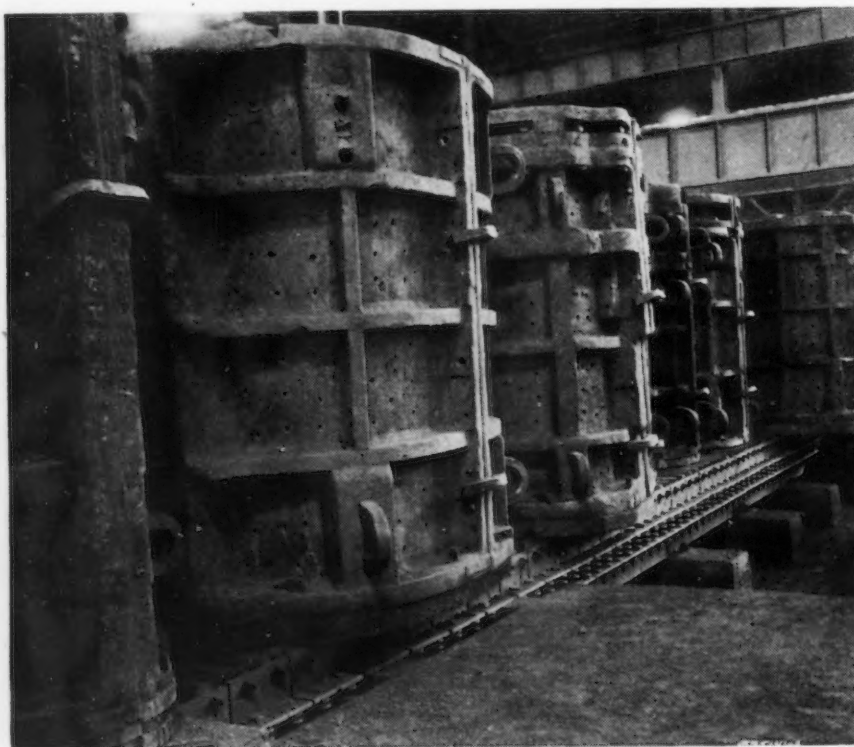
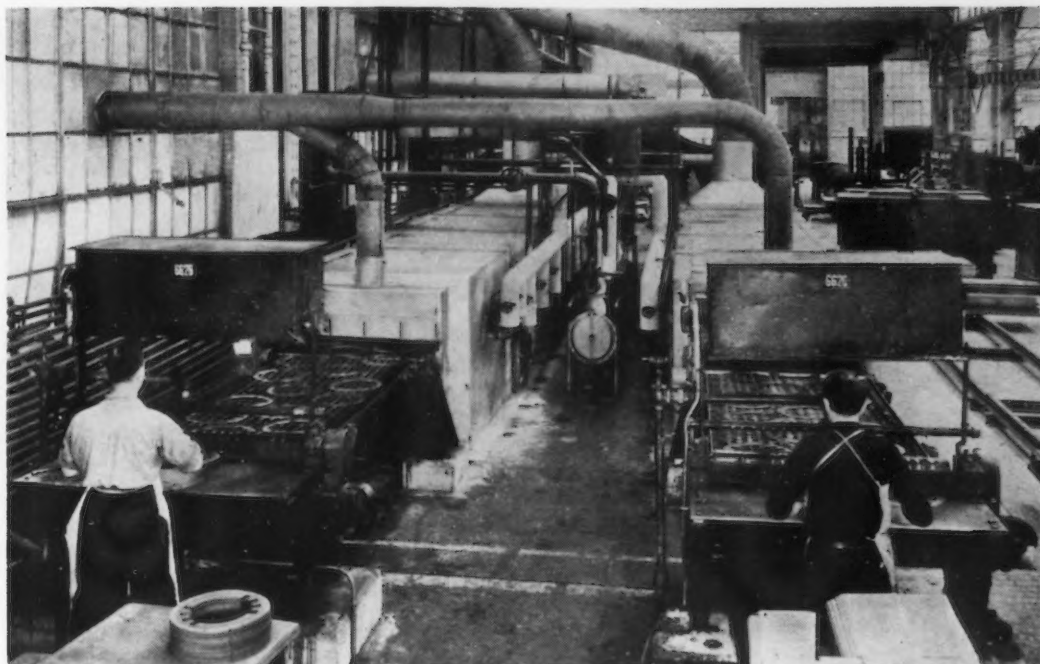


FIG. 5—The new Mathews resilient suspension gravity roller conveyor, handling flasks in a large foundry.

FIG. 6—Continuous flow of transformer disks through a battery of Gehnrich flash enameling ovens in an electrical manufacturing plant.



heavy-duty roller conveyors in the foreground, which are pitched sufficiently to cause the coils to travel by gravity to the down-tilters. Each down-tilter delivers a single coil to a trough-section roller conveyor, which in turn discharges the coil to a side-tilter unit. The side-tilter delivers the coil, as needed, to the coil box of the uncoiling machine at the head end of the pickling unit. Fig. 2 shows a coil which has just been delivered to the coil box by one of the side-tilters.

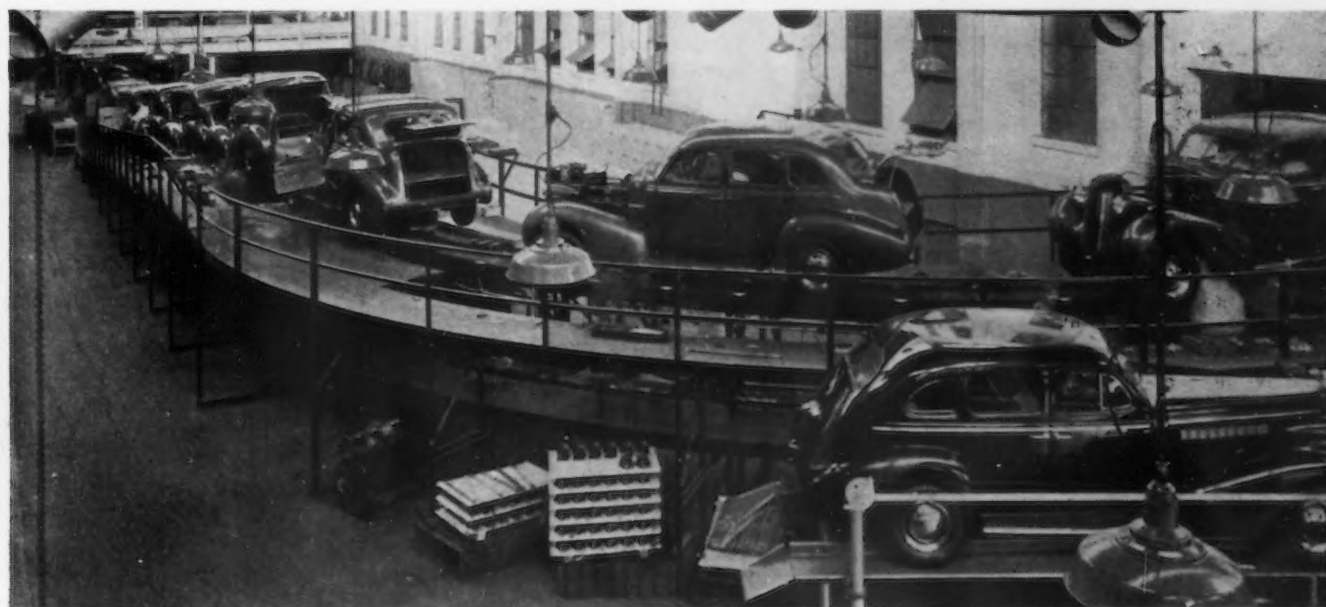
At the discharge end of the pickling units the recoiled strip rolls onto a V-shaped pedestal mounted on a scale platform, is tied, weighed, and the

weight recorded. Each coil is then discharged onto a heavy-duty apron conveyor leading to a skid table, as shown in Fig. 3. From these skid tables the finished coils are transferred by trucks to storage or to the shipping platform.

It is of importance to note in this series of operations, first, that the material is fed into the pickling units

just as fast as those units can take it; second, that there can be no delay here, for as each coil is unrolled, another coil is poised in readiness on the side-tilter immediately in front of the coil box; third, that adequate storage, or loading line facilities precede the above operations; and fourth, that the handling operations are entirely automatic, both at the pickling unit intake points and at the discharge points. Thus the speed of handling becomes a function of the speed of operation of the pickling units, and the pickling operation does not have to wait on the possible vagaries of an intermittently operating materials handling system.

FIG. 7—Almost ready to drive away. A Palmer-Bee automotive assembly line conveyor nearing the end of its journey.



In Fig. 4, lines of Standard Conveyor Co. trough-shaped gravity roller conveyors in another strip mill are shown leading from similar pickling units into a coil storage room. Note particularly, here, the middle line of conveyor, to which coils traveling by gravity on either side line are transferred by means of a kick-over mechanism, controlled by the operator pictured. In this mill it is considered advisable to transfer the coils on their sides to the storage room, but when stacked in storage it is best to have them stand on end. Consequently the middle line of conveyor leads to an up-ender mechanism, which delivers

and the conveyor lines serve as a means of storing empty flasks until needed.

Other Conveyor Types

Fig. 6 illustrates a type of conveyor which carries material directly through the processing equipment. Two Gehrich flash enameling ovens, heated by an external oil heating system located between the ovens, are used in a large electrical manufacturing plant for treating transformer core plates at 660 deg. F. The process is a continuous one, and requires the material to be moved through the ovens at a constant rate of speed. The thin plates are placed by hand on an in-

definite stations workmen complete particular assembly jobs.

An excellent detail view of such a conveyor is shown in Fig. 8—also a Palmer-Bee installation. Here the continuously moving chain is shown riding on its regularly spaced trolley wheels, which in turn carry apron plates of a size adequate to hold various-sized loads of boxes, crates, pallet-loads of material, or miscellaneous loads of material directly.

In all the foregoing examples, the principles of continuous flow are exemplified. Likewise, the type of load varies from coils of strip metal to foundry flasks, to light, thin metal

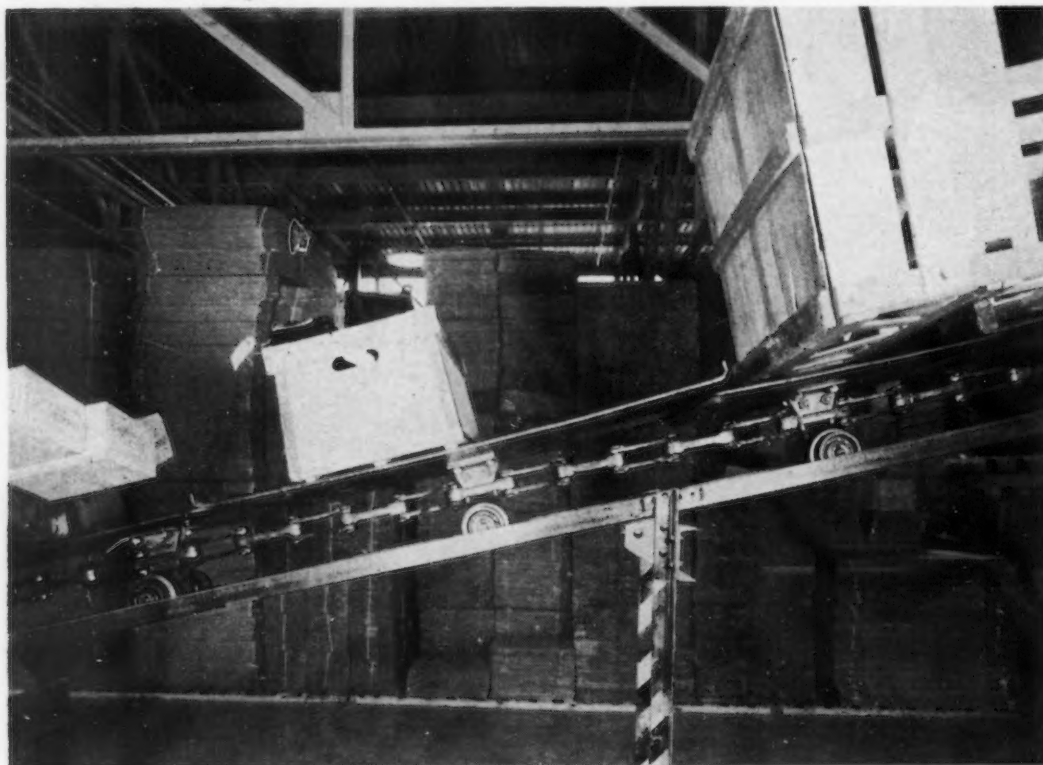


FIG. 8—Close-up of a typical Palmer-Bee continuous chain package conveyor, similar in general principle to the automotive assembly line conveyor.

the up-ended coils to the flat conveyor table in the background, from which the coils are picked up and stacked by overhead crane.

In Fig. 5 a new type of spring-suspended gravity roll conveyor, built by Mathews Conveyor Co., is used in a large foundry to handle heavy flasks. Normally, the delivery of heavy flasks by overhead crane to a roller conveyor produces a shock load of great severity on the roller bearings. The resilient mountings in this new type of conveyor are designed to take such shock loads without bearing damage. Each roller is designed to take up to an 8000 lb. load. Such conveyor lines are pitched toward the discharge end so that the flasks travel by gravity,

verted, U-slat, flat conveyor which rides in track angles for a total distance of 31 ft. The conveyor is 5 ft. 5 in. wide. At the discharge end the work falls off the conveyor into receiving bins, and the conveyor returns at the bottom of the oven to the loading position.

The continuous flow principle has been brought to a high state of development in the automotive industry. In Fig. 7 is shown an automotive assembly line conveyor as made by Palmer-Bee Co. for a leading car manufacturer. On this conveyor, of the drag-chain type, entire cars are carried at definite intervals, on cradles; the movement of the whole line progressing at such a rate of speed that at

disks, to automobiles, to miscellaneous packages. Fundamentally, regardless of the characteristics of the load in any case, the problem is identical; materials are to be moved forward, continuously, at a rate of speed accommodated to the needs of the situation. All materials handling problems are not so simple, of course. When they are, it is likely that some form of industrial conveyor will provide the best solution. It is interesting to note, however, that conveyor problems are always reducible to simple terms. When the conditions faced preclude the possibility of a statement of the situation in similar simple terms, other equipment than conveyors must almost invariably be considered.

Creep of Metals Under Static and Repeated Stresses

By F. C. LEA*

Professor, Sheffield University, England



CREEP studies cover months of time and require extreme accuracy in equipment and observation. This machine at the Westinghouse Electric & Mfg. Co. laboratories is one of the most elaborate of its kind—photo-electric tube maintains an inside temperature of ± 10 deg. at 1000 deg. F.; each weight below stresses a specimen through a lever arrangement; and the microscope on the circular track permits measurement of elongation of any particular specimen.

THE demand upon metals to work at increasingly higher temperatures during the last 25 years has made it necessary to change the point of view from which the suitability of a particular metal for a particular purpose shall be judged. Before the great war a good deal of work had been done on the effect of temperature on the properties of metals as judged from what were thought to be the fundamental properties of metals, namely, the maximum stress required to break a specimen without reference to time of fracture, the so-called elastic limit and the yield point.

When the author began experiments 23 years ago on the effect of temperature on the properties of metals, it soon became clear that when certain temperatures were reached, none of the so-called fundamental properties were independent of the time taken in loading and also that at constant stress, whether direct or torsional

stress, strain might continue, and at certain stresses, much less than the so-called breaking stress obtained by loading the specimen comparatively quickly, fracture might eventually occur. Further, in a paper published in 1917 in the *Proceedings of the Royal Society*, the author and J. J. Guest showed that at even ordinary temperatures and at stresses far below the elastic limit, small increases of strain might occur at constant stress. It soon became evident that the phenomenon now known as "creep" was of great importance, but unfortunately the war work and, for some time after, other research prevented the phenomenon being investigated. Experiments on the effect of high temperature on aluminum alloys,

coiled springs for aircraft and valve seats for airplane engines all showed that the relationship of stress and strain could not be determined without consideration of what may be called the time element, or time function if that term is preferred.

Preliminary experiments quickly indicated that the investigation of the phenomenon of creep would require years of research and the devotion of a large number of workers. As a preliminary, experiments were carried out on a number of metals at ordinary temperatures. Taking, for example, a specimen of mild steel, the fundamental properties of which are so well known, the creep in the neighborhood of the yield point was investigated, and it was shown that when yield

*Abstract of lecture before Midland Metallurgical Societies, Sept. 22.

occurred at a particular stress, increasing strain or creep might continue for some hours; however, it seemed quite certain that the creep eventually ceased.

Further, at stresses beyond the yield point, but well below the breaking stress, creep would continue for long periods but would eventually cease. For instance, a mild steel containing 0.14 per cent carbon, heat treated at 1517 deg. F. crept at 31,360 lb. per sq. in., at first irregularly and then very slowly but steadily for almost four hours. As the stress was raised, creep took place for several hours at 33,600 lb., 35,840 lb. and over, until at 56,000 lb. per sq. in. the specimen crept until it finally broke in a little over five hours, the total time of loading after yield being 42 hr.

Another specimen, normalized at 1634 deg. F. was loaded gradually to 59,136 lb. per sq. in., and the load was kept constant for fourteen days. During the last four days no movement was observable by an extensometer capable of measuring extensions of much less than 1×10^{-5} in. With a sample of stainless steel containing 18 per cent chromium and 8 per cent nickel, small creep took place at 13,440 lb. per sq. in., but after 20 hr. no creep could be detected. At 22,400 lb. per sq. in., creep apparently ceased after 60 hr., no creep being observable after a further 40 hr. At 31,360 lb. per sq. in., comparatively rapid creep continued per 106 hr., and had probably just ceased. At 89,600 lb. per sq. in., after 672 hr. creep could not be observed, but at 98,560 lb. per sq. in., the specimen broke in ten minutes. If broken quickly a similar specimen would not break at less than 123,200 lb. per sq. in.

Preliminary experiments at high temperatures showed that very long times would be required to determine the stress at which rate of creep would become so small that it could not be observed, and it also soon became apparent that very sensitive strain measuring devices were necessary and that control of temperature of the test was of the greatest importance. For example, it will be seen later that reference will be made to creep strains per hour of less than $\frac{1}{10^6}$. Suppose a specimen 2 in. long is to be tested and the rate of creep is $\frac{1}{10^6}$ in. per in. per hr., then the elongation in say 10 hr. will only be 0.00001 in. per in. Suppose now that the temperature of the test changes by

3.6 deg. F. then the change in length of the specimen will be 0.000028 in., or in other words is much greater than the change due to creep. It appears therefore that changes of temperature during the test must be controlled to within very narrow limits, or comparatively long periods of time must be taken. If one degree centigrade (1.8 deg. F.) change of temperature occurs, then for a creep strain of $\frac{1}{10^6}$ to be observed with any confidence, the time of observation must be greater than x hr. when $\frac{1}{10^6}$ is greater than 0.000014, or x is greater than 14 hr.

Torsion Testing Easier

Again, it will be clear that if a specimen is tested in tension and creep occurs, the specimen changes in diameter, and if the load is kept constant, the stress changes. This is not a serious difficulty when creep is small, but it can be got over if the test is in torsion instead of in tension and, as will be seen later, torsion testing is on the whole much easier than tension testing, and if hollow specimens are used the stress variation can be kept fairly small. For standard testing, the author is inclined to the view that the torsion test has many advantages.

There are two important points to be noted about creep tests such as are being described. The first is—what is the total strain produced in a given time, and secondly, what is the final rate of creep, or is the final rate of creep less than some specified rate? In the case of material for boiler tubes, the increase of diameter per inch diameter of the tube was $\frac{9}{10,000}$ in., and the final rate of creep was less than 10^{-7} in. per in. per hr. If this rate of creep remained constant, the boiler could work 100,000 hr., that is about 12 years' continuous work, without the tube increasing in diameter another hundredth of an inch.

The creep was comparatively large on first loading, and it is pertinent to ask, "What is the reason for diminution in the rate of creep?" The answer appears to be that strain work-hardens the material. The next question which arises is "Will the prolonged heating produce changes in the metal that will allow the rate of creep to increase again, and to be such as will lead to failure?" That changes in the properties of steels do take place by prolonged heating at the temperatures at which modern steam plants work is now well known. Spher-

oidization of the pearlite in carbon steels, as shown by Bailey and Roberts, takes place and this leads to an increase in the rate of creep at a particular stress. Further, as the author has shown in a number of published papers, changes take place in certain alloy steels which lead to embrittlement and to the very considerable lowering of the impact value obtained from the Izod test. Experience shows, however, that provided stresses and temperatures are kept below certain values, creeps are so small that they are not observable in practice and do not lead to failure.

Pipe Flanges Tested

From what has been said it will appear that the ordinary method of defining the breaking stress of a material and using some function of this in designing parts of structures or machines to work at high temperatures cannot be satisfactory, and it becomes necessary to define what may be called a "limiting creep stress" or a "limiting creep rate" at a particular stress, and also the maximum possible strain in the assumed life of the plant. Below certain temperatures, the limiting creep stress, or the stress below which creep ceases has, the author believes, a real meaning but above certain temperatures it seems possible that creep will be continued even at small stresses.

The Institution of Mechanical Engineers (English) has, during the last three years, been carrying out researches at the National Physical Laboratory on pipe flanges for high pressure steam plants. In the design of such joints a number of problems arise, but the one in which interest is centered is that of the possible creep of the materials under temperature and stress. The second report gives some interesting particulars of the creep of flange bolts at a temperature of 975 deg. F., and under a pressure of 1400 lb. per sq. in. Failure occurred after 23 days. The full consideration of the strains that occur in a flange joint when under the stress of tightened bolts and heated for long periods during which creep can take place, while of interest and importance, is by no means easy.

The tightness of the joint depends upon sufficient pressure being retained on the joint face. When the nuts are tightened, the bolts and other parts of the joint are elastically strained. During the heating of the joint, these strains will be modified and some creep will take place. The bolts and other parts of the flange creep so that

the elastic extensions are diminishing. When the permanent distortions reach a certain amount, the joint fails. By changing the design, it is hoped to increase the life of the joint. From the data that has been presented, it is clear that when creep under stress and temperature occurs, a very large proportion of the total creep takes place in the early stages. Thus, as is well known, the joint must be tightened after a period of service. It seems very desirable to subject the bolts to initial heating under stress so that a large initial creep shall be eliminated before the bolts are stressed by the pressure of the pipe.

Periodicity of Stress Important

The creep of metals has been shown to depend upon the length of time any particular stress is applied. If, therefore, a specimen is subjected to repeated stress cycles, it might be expected that the resistance of the material would depend upon the periodicity of the cycles, and if creep did occur, the form of the creep curve would be similar to those under static stress. It can be shown that in a specimen of steel containing 0.46 per cent carbon, subjected to cycles of tension and compression at 2000 cycles per minute, very small extensions took place, and finally the specimen broke after a known number of repetitions. At a stress range of plus or minus 31,808 lb. per sq. in., and at a temperature of 745 deg. F. nearly 6,000,000 repetitions were resisted, and at 34,048 lb. per sq. in., and 766 deg. F. the specimen broke at less than 250,000

repetitions. In the case of a spiral spring tested at 752 deg. F. at a rate of oscillation of 160 cycles per minute, when the mean stress was 44,800 lb. per sq. in., the spring crept and broke after 5,000,000 repetitions. When the mean stress was 17,920 lb. per sq. in., there was creep, but it became less and less and fracture did not occur in 8,000,000 repetitions. It is of interest to notice, that with rapidly repeated cycles of stress, ranges of stress at temperatures as high as 1112 deg. F., can be resisted for many million cycles, nearly as great as those that the material will resist at ordinary temperatures. When the cycles are repeated slowly, say two or three per minute, then the behavior of the specimen is very similar to that under a steady load.

Under cycles of stress in tension from 0 to x lb. per sq. in., at the rate of $2\frac{1}{2}$ cycles per minute, the form of the creep curve is not very different from that under a static test. At 817 deg. F. a mild steel which had a tensile strength of 62,720 lb. per sq. in. will, at a static test of 13,440 lb. per sq. in., settle down to a steady creep of the order of 10^{-7} in say 20 to 30 days. Under repeated tensile and compressive stresses of 2000 cycles per minute it will withstand a range of plus or minus 31,360 lb. per sq. in., for many millions of reversals, but under $2\frac{1}{2}$ cycles per minute a direct tensile range of from 0 to 18,000 lb. per sq. in. would probably cause creep and fracture in a few months.

To summarize—creep can take place

and lead to fracture under static stresses at temperatures above 572 deg. F. at stresses much less than those which will break the specimen when loaded quickly. At 572 deg. F. the stress at which the rate of creep becomes less than an allowable amount for say all types of pressure vessels is about half the tensile strength at that temperature, while at 932 deg. F. it is less than one third of the tensile strength at that temperature. In designing plants or machines to work at temperatures well above the atmospheric temperature, the designer must carefully consider what possible maximum strains he can allow and what the final life is likely to be. Working stresses must then be chosen consistent with these. It should not be overlooked that conditions other than strength and creep magnitudes have to be taken into account. Some materials, though having fairly good creep resisting properties at temperatures of the order of 932 deg. or 1112 deg. F., may embrittle badly, as for example some of the nickel-chrome steels, and some of the so-called heat-resisting steels. The relative values of steels to meet any particular new conditions can be approximately obtained by short time tests, but as yet no short time test has been developed that will indicate the final rate of creep that, after a certain time at a particular stress, the metal will settle down to, or in other words that will determine what will be the limiting creep stress, or the stress at which the rate of creep will become less than a specified rate applicable to a particular design.

October Finished Steel Shipments Up

UNITED STATES STEEL CORP. subsidiaries shipped 663,287 tons of finished steel products in

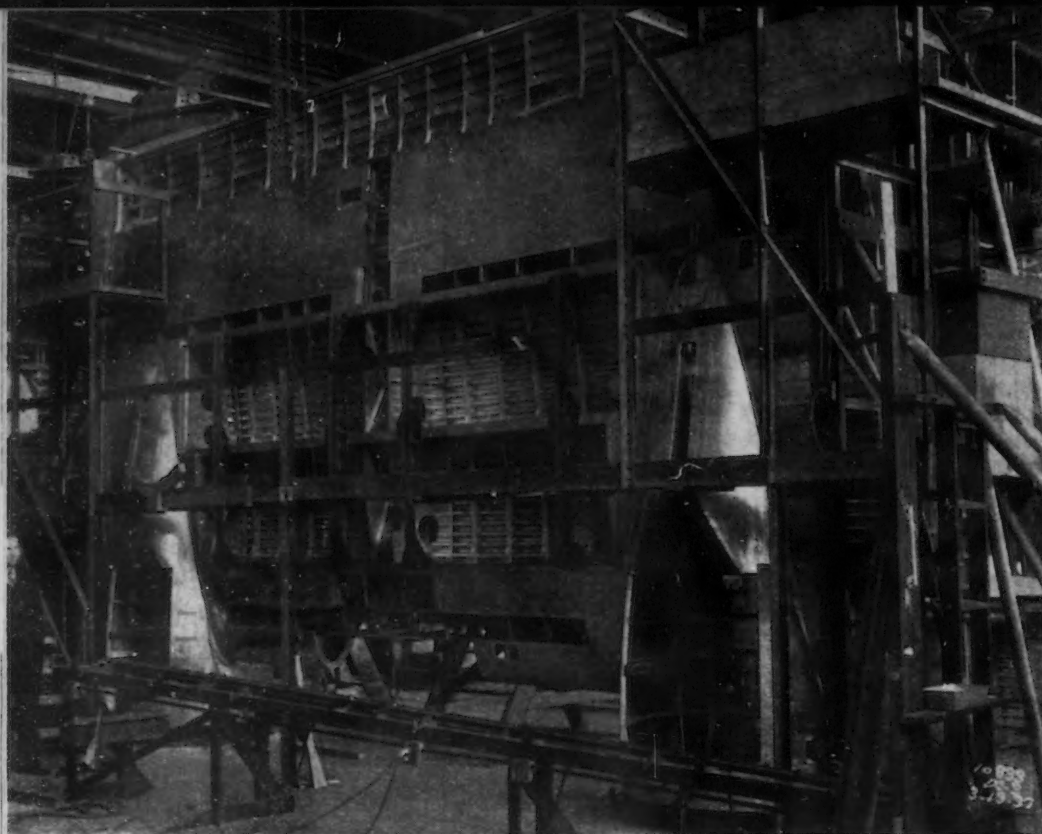
October, an increase of 85,621 tons over September and 129,023 tons below shipments in October, 1937. Ship-

ments for the first 10 months of 1938 were 5,251,511 tons against 11,749,156 in the comparable period of 1937.

MONTHLY SHIPMENTS OF FINISHED STEEL PRODUCTS BY UNITED STATES STEEL CORP.—TONS

Month	1934		1935		1936		1937		1938	
	Shipments	Per Cent of Capacity	Shipments	Per Cent of Capacity	Shipments	Per Cent of Capacity	Shipments	Per Cent of Capacity	Shipments	*Per Cent of Capacity
January	331,777	19.8	534,055	31.9	721,414	44.8	1,149,918	75.4	518,322	33.7
February	385,500	25.9	583,137	39.2	676,315	45.3	1,133,724	82.5	474,723	35.5
March	588,209	35.2	668,056	41.5	783,552	50.5	1,414,399	92.7	572,199	37.2
April	643,009	41.5	591,728	36.7	979,907	63.2	1,343,644	91.0	501,972	33.7
May	745,063	44.5	598,915	35.8	984,097	63.4	1,304,039	85.5	465,081	30.2
June	985,337	61.2	578,108	36.7	886,065	57.1	1,268,550	85.8	478,057	32.1
July	369,938	23.9	547,794	34.0	950,851	61.3	1,186,752	77.9	441,570	29.8
August	378,023	22.6	624,497	37.3	923,703	59.6	1,107,858	72.6	558,634	36.3
September	370,306	23.9	614,933	39.7	961,803	62.0	1,047,962	71.1	577,666	37.5
October	343,962	20.6	686,741	41.1	1,007,417	62.6	792,310	52.0	663,287	43.1
November	366,119	22.7	681,820	42.3	882,643	59.2	587,241	39.7	.....	.....
December	418,630	27.0	661,515	42.7	1,067,365	68.8	489,070	32.1	.....	.....
Minus yearly adjustment	(—19,907)	...	(—23,750)	...	(—40,859)	...	(—77,113)	...	.....	...
Total for year....	5,905,966	30.6	7,347,549	38.1	10,784,273	58.2	12,748,354	70.4	.....	...

*Annual capacity 18,114,000 gross tons, with monthly percentages based on actual number of weeks in each month.



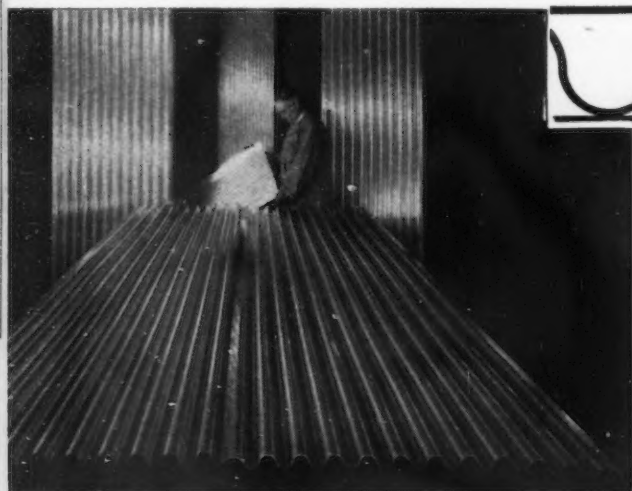
IT would be hard to imagine a more interesting or difficult problem in sheet metal fabrication than the modern all metal plane. Here is a section of one wing of a four motor transport plane with the motor cockpit built into the wing.



CLOSE-UP view of a corrugating die stiffener

o o o

Aircraft Evolution Metal Work in



THESE corrugated aluminum sheets form the wing stiffeners which are later covered with smooth "skin metal." This construction, shown in diagram, gives the maximum strength with the minimum weight. Sheets 18 ft. in length are typical and these sheets run in thickness from 0.005 in. "airplane skin" to $\frac{1}{4}$ in. and $\frac{3}{8}$ in. aluminum alloys.

o o o

AIRCRAFT evolution has made heavy demands upon the sheet metal producers for materials suitable for aircraft wing and fuselage construction. It is a far cry back to the wood and fabric "flying machines" of the early days.

Many new problems in accurate fabrication of sheet metal have been introduced by this change in design

THE problem of shearing an 18 ft. length of 0.005 in. stock requires a knife clearance of the order of 0.001 in. The mechanical problems of setting and maintaining this clearance between two knives 18 ft. in length are indeed of a high order, especially considering changes in temperature. Illustrated is an 18 ft. shear constructed especially for this purpose and in use by the Northrop Aircraft Corp., Inglewood, Cal.



o o o

AT RIGHT

FORMING the corrugations in long sheets requires an equal degree of accuracy and precision as does shearing. In this illustration we see a press brake at work on aluminum sheets which are being corrugated for wing stiffening purposes.

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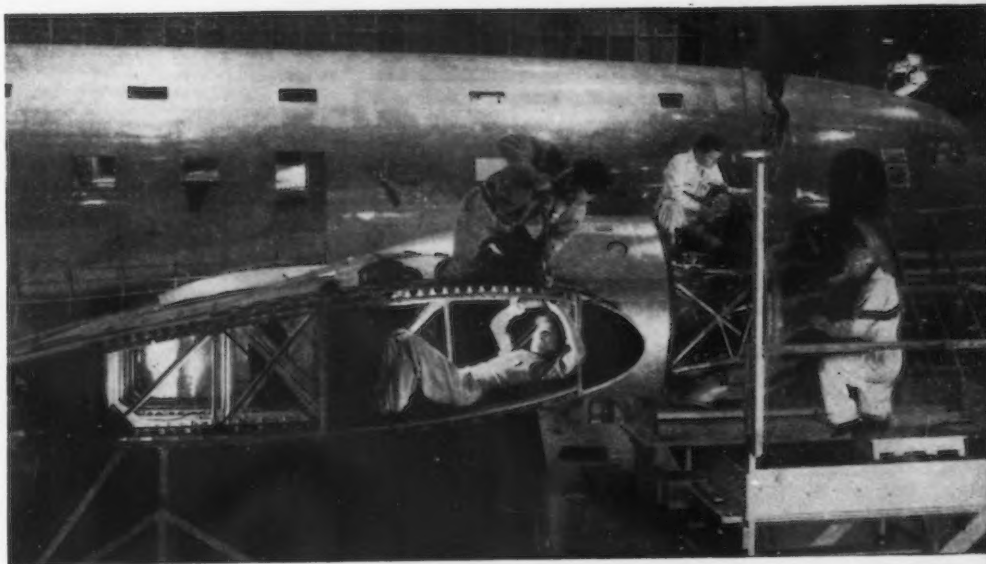
at work in a press brake on airplane wing sheets.

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Stimulates Sheet Working Progress

and construction. And the machinery builders who provide the brakes and shears for fabricating the metal parts have had to keep pace with this demand.

This article outlines some of the requirements and some of the accomplishments in meeting the challenge of progress in aircraft evolution.



HERE we see assemblers at work on a wing of one of the Douglas Aircraft Corp. transports. Note the corrugated sheet stiffeners between inner and outer skin.

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FINALLY we see a Douglas four-motor transport assembled and preparing for its proof test. A splendid example of sheet metal fabrication.

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Further Advances in Spot, Arc

By FRANK J. OLIVER

Associate Editor, *The Iron Age*

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IN the previous review of welding apparatus developments (July 28, p. 34), a description was given of the operating principles of the Ultra-Speed spot welder made by the Roth Welding Engineering Co., Inc., which had licensed *Federal Machine & Welder Co.* and the *Taylor-Winfield Corp.*, both of Warren, Ohio, to use the technique (covered by U. S. Patent No. 1,754,948), as well as the *Thomson-Gibb Electric Welding Co.*, of Lynn, Mass. *Federal Machine & Welder Co.* has since acquired the

Roth company (*THE IRON AGE*, Oct. 6, p. 57) and we are presenting in these pages one of the specific Federal applications and a close-up view of the secondary current distributing unit with a detailed explanation of its function.

Other Types of Spot Welders

THE model B spot welder offered by the *Thomson-Gibb Electric Welding Co.*, Lynn, Mass., in transformer capacities of 10, 15, and 20 kva., is a popular priced machine that will handle the medium duty range of sheet metal and general welding shops. The unit is supplied in 8, 12 and 18 in. throat, with adjustable electrode stroke by means of a stop screw at rear of foot treadle beam. The standard machine is supplied with air cooled transformer, horns and dies. Welding

FURTHER details are given of a high speed spot welding technique mentioned in the last review of welding equipment, and a number of other recent spot welding machine designs are illustrated. An outstanding development is a water-cooled kickless cable for gun welders. In the arc welding field, a number of new equipments, both of the transformer and the mo-

current control is by means of a heavy duty double-pole switch mounted on the back bar in the rear of the machine. It cannot close until welding pressure is applied, provided the electrodes are properly set. Welding

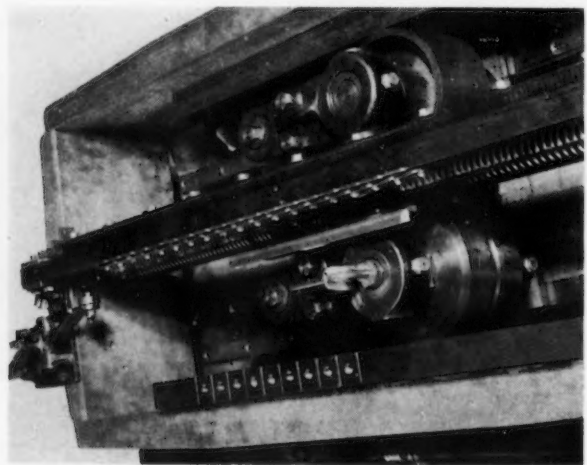
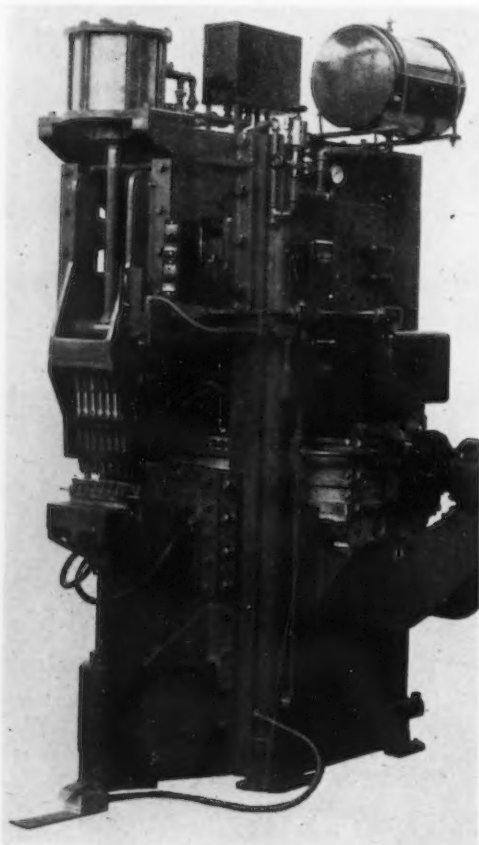
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THIS Federal Ultra-Speed spot welder shown with fixture for welding flexible ice tray grids makes 5.3 spots per sec., or a production of 1000 to 1200 grids per hr. The individual electrodes act as hold-down clamps, actuated through individual springs and an air cylinder.

• • •

BELOW

CLOSE-UP of the secondary current distributing unit of the Ultra-Speed spot welding unit covered by U. S. Patent No. 1,754,948. The secondary circuit is established successively for each electrode by a roller conductor mounted on a horizontal screw spindle, driven by a fractional-horsepower motor using change gears for variations in speed to give 5 to 20 spots per sec. The timing of each weld is accomplished by a switch (wired in series with a tube type contactor) mounted on the contact roll assembly, which makes and breaks in an adjustable notched bar, each notch corresponding to one welding electrode. The screw drive is reversible.



and Gas Welding Apparatus

tor-generator type, have been introduced for welding light gages, and two engine-driven types of machines for portable use are noted. Auxiliaries for arc welding include a fume collector and a new type of close fitting helmet. Several improvements in apparatus for gas welding and cutting have been announced by one of the largest suppliers.

pressure is adjustable by handwheel up to about 200 lb. Five values of welding current provide for any job within the range of the machine.

Kickless Cable for Gun Welders

A RADICALLY new type of water-cooled electrical connection between the secondary taps of a welding transformer and a portable

welding gun is found in the Kickless cable recently introduced by the *Clark Controller Co.*, 1146 East 152nd Street, Cleveland. The illustration shows the unique construction whereby it is possible to run the cooling water at low pressure in direct contact with the helically wound, tinned-copper electric cables. By interweaving cables of opposite polarity within the rubber spacer, the reactance between cables is neutralized and the "kick" that occurs when two separate cables tend to fly apart through reactance force is eliminated, as is the necessity of lashing separate cables together to prevent this action. The outer hose of the Clark cable is of ample strength to resist distortion due to water pressure, but light enough to provide the flexibility required.

Tests made by the company indicate that this type of construction permits the passage of about 50 per cent more welding current for equal voltage than can be passed by separate welding

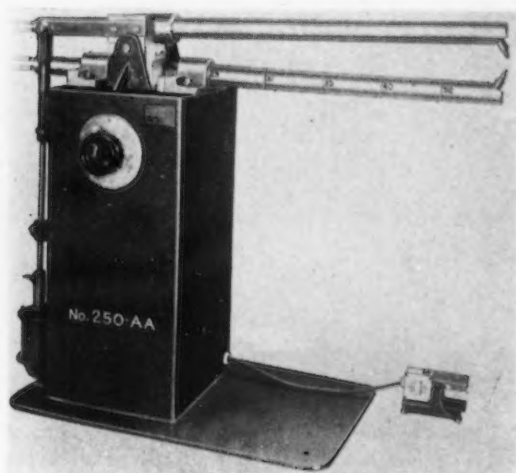
cables of comparable size. Conversely, for equal amperage passed, approximately 50 per cent less secondary voltage is required with the Clark Kickless cable. Operator fatigue is lessened because of the absence of the usual kick and the life of the cable is longer for the same reason. These cables come in four sizes, ranging from a copper area of about 133,000 circular mils for the No. 1 size to 629,724 c.m. for the No. 4. All sizes are available in overall lengths of 3 to 12 ft.

Electronic Type Welder

A NEW and improved form of low-cost resistance welding process of an electronic type has been developed by *General Electric Co.*, to replace soldering operations in the manufacture of small parts, such as radio sets, business machines and industrial control devices. A current of several thousand amperes flows in

BELOW

THE markings on the lower horn of this universal spot welder, made by the Eisler Engineering Co., Newark, N. J., represent the kva. ratings of the machine at various extensions of the upper and lower horns. The machine is intended for deep sheet metal work, but will also weld heavier work in the short extension position. Water cooling goes through the entire length of the arms. This type of machine, which will weld from 30 to 150 spots per min., is made in three sizes: from 25 to 50 kva., as shown; from 5 to 25 kva., and from 40 to 75 kva. Various attachments are available for deep box welding.



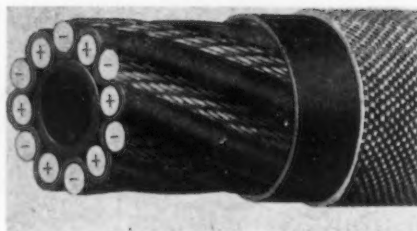
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BOTH pressure and current are applied by the foot treadle which actuates the upper welding arm through a pressure spring and a back bar in the Thomson model B spot welder.



the secondary circuit of the welder for a brief interval precisely timed by an ignitron tube and its associated control circuit. This control circuit includes a dial for regulating the heat by the phase-shifting method. Maximum heat is obtained with a current duration of slightly more than 1/120 sec. The welding transformer and its associated equipment are suitably enclosed.

Tongs are used with the equipment in the welding of solid or stranded wires to terminals. Likewise, a suitable bench welder can be utilized to weld small studs (0.010 to 0.050 in. in diameter) to flat surfaces with little or no marking on the opposite side of the sheet of metal. Similar equipment is suitable for the spot-welding of thin

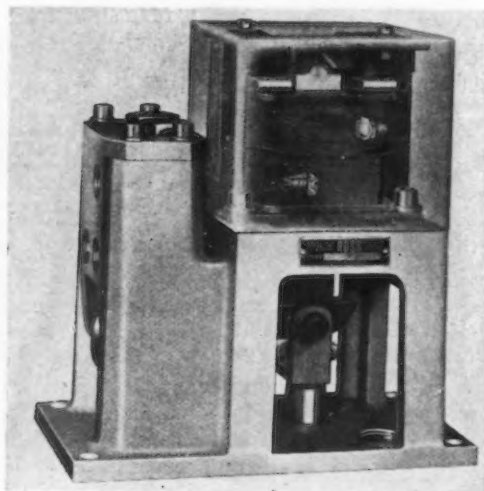


SECTIONAL view of the Clark Kickless cable for gun welders, showing cables of alternate polarity separated by a corrugated live rubber spacer, the whole being enclosed in a rubber tube reinforced by a wire and woven cloth covering. This construction permits circulating of cooling water in direct contact with the stranded copper cable.

Arc Welder Developments

SEVERAL arc welding machines, both of the transformer type and the motor-generator set type, have been

announced recently for arc welding light gage materials. The new 150-amp. *General Electric* a.c. arc welder of the transformer type, with range of 35 to 180 amp. is such a type for low current welding with heavily coated electrodes. Continuous, stepless current control is obtainable by means of a handcrank, and adjustment can be made at any time without interrupting the arc. A choice of two open-circuit voltages (80 and 100 volts) is given through two taps and the welding lead is quickly attached by means of a tapered plug connector. A circular cover plate over the terminals prevents chance contact with the terminal not being used. Portability is provided by casters or by means of a hoist sling around the handcrank.



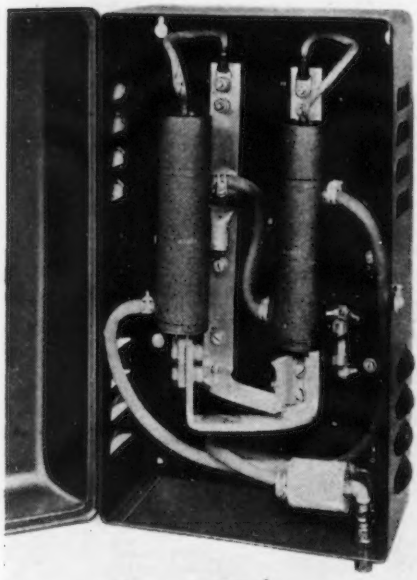
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AIR line pressure is utilized for reversing the poppet valve action in a new line of solenoid controlled air valves for either single or double-acting cylinders such as are used for various welding operations. Elimination of return springs makes possible the use of smaller solenoids. Simple construction is used throughout, with easy access to all working parts, making the valves particularly adaptable to production operations where extreme serviceability is of major importance. These valves, made in 1/2-in. pipe size, are a product of the Ross Operating Valve Co., 6485 Epworth Boulevard, Detroit.

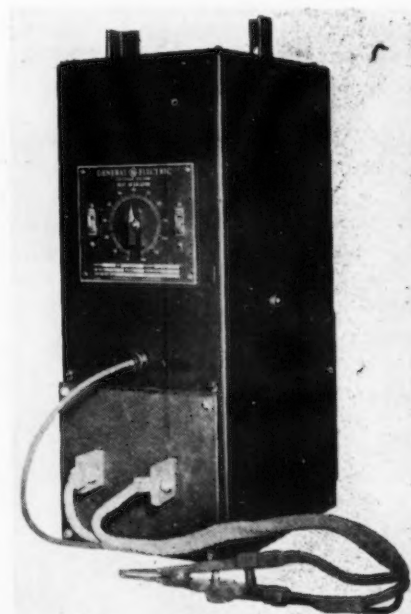
sheets of various alloys with little or no oxidation or discoloration.

Electronic Welding Contactor

FOR welding mild steel products and similar metals, a new Weld-o-trol electronic power switch for controlling the primary of welding transformers and suitable for use with existing timing devices is announced by *Westinghouse Electric & Mfg. Co.*, East Pittsburgh. The unit acts as a single-pole, single-throw switch, but uses either sealed-off or continuously pumped ignitron tubes, and hence is free of moving parts, arcing contacts and noise. The tubes are water cooled, and in the former type a water flow relay provides protection against either water failure or stoppage of the drain line. A pressure switch is used on the pumped Weld-o-trols. About 2 gal. of cooling water per min. is required. Available ratings are roughly equivalent to 300 and 600-amp. conventional welding contactors.



NEW, low-cost Weld-o-trol electronic power switch for controlling the primary circuit of welding transformers. Low maintenance and longer welding tip life are claimed by Westinghouse, the former since there are no moving parts nor arcing contacts.



THIS G-E 1/2-cycle electronic-controlled transformer type welder is an inexpensive model designed to replace soldering operations on small electrical components.

Woven, spun glass, fireproof insulation is used for the windings.

GENERAL ELECTRIC is also offering a new 150-amp. d.c. arc welding equipment of the motor-generator type for the same class of work. Any welding current within its range of 20 to 200 amp. can be obtained by means of a three-point selector switch and a dial for intermediate adjustment. Isothermic overload protection permits the apparatus to carry maximum safe overloads without danger of burnouts and without unnecessary interruptions on harmless overloads. The equipment is said to have high, instantaneous recovery

of voltage, thus preventing arc pop-outs at all points of its range when any good bare, lightly coated or heavily coated electrode is used. The absence of excessive current surges also prevents excessive spatter loss and sticking of the electrode.

ANOTHER single-operator motor-generator arc welder designed primarily for light gage work is the model SC 100-amp. machine announced by the *Wilson Welder & Metals Co., Inc.*, 60 East 42nd Street, New York. Adjustment of the output of the generator is accomplished by the use of five receptacles with plugs for current or heat control and a multi-point field rheostat for adjustment of the open circuit voltage. The generator is of two bearing construction and rotates at 1800 r.p.m. It is self-excited from the main brushes, being compound wound with accumulative series field. A reactor provides a high degree of arc stability. Reversed polarity is provided by interchanging two plugs without removing the welding cables.

TYPE W, 1939 model Alternarc machine, the latest development of the *Electric Arc Cutting & Welding Co.*, 152 Jelliff Avenue, Newark, N. J., is a transformer type arc welding unit in which the current and voltage are compensated for constant heat. Proper voltage is supplied for each current automatically by sliding a portion of the core of the transformer in and out so as to divert the flux from the teaser or control coil. Low voltage is provided for heavy current and high voltage for light current, with interpolation between the extremes of the range. With such a constant energy machine, it is claimed that as much as 50 per cent demand can be saved.



FOR light-gage work, G-E offers a 150-amp. arc welding transformer with 220-volt primary and with 80 and 100-volt secondary outlets. The low voltage plug connection is shown.

the power factor is bettered, and the welding made smooth and reliable. Meters are provided to show the current-voltage relationships and also the rated capacity.

Besides being useful for conventional arc welding, such a machine can be utilized for local heating, such as in brazing operations with tongs, or for hardening or annealing.

TWO engine driven arc welders have been announced for portable, field service. *Westinghouse's* 200-amp. FlexArc model SFA uses a model T50 *Chrysler* industrial engine, said to consume only 2 gal. per hr. of fuel at rated load. Motor is equipped with a governor and hydraulic idling device. Generator varies the current output by means of a magnetic shunt in the armature reaction flux path.

The current output adjustment is by a handwheel, with the setting read on a dial mounted behind a glass window inside the generator frame. A polarity reversing switch is incorporated.

A 24-HP., four-cylinder *Continental* water-cooled gasoline tractor engine is used for power in the P & H Hansen 200-amp. "Special" arc welder made by the *Harnischfeger Corp.*, of Milwaukee. The generator of this unit has an intermittent welding range of 35 to 225 amp. and is built to handle electrodes up to 7/32 in. diameter under continuous manual operation.

Welding Positioner

STRUCTURES can be welded on both top and bottom in addition to all sides without changing the original set-up in the newly designed welding positioner now being marketed by the *Cullen-Friedstedt Co.*, 1303 S. Kilbourn Avenue, Chicago. The table can be revolved through a full circle by means of one handwheel and can be tilted up to 135 deg. from the horizontal by means of a second handwheel. Gears for revolving and tilting are self-locking, and the former may be disengaged for turning the table freely when welding light, bulky structures or circular work. Height of the positioner can be adjusted from 36 to 48 in. Base is 30 x 39 in. and sets flat on the floor. Capacity is 2500 lb. with load center of gravity 6 in. from table face.

Arc Welding Electrodes

SMOOTHARC HARTUNG electrodes, supplied by *Harnischfeger Corp.*, Milwaukee, have a base metal of high quality tungsten molybdenum



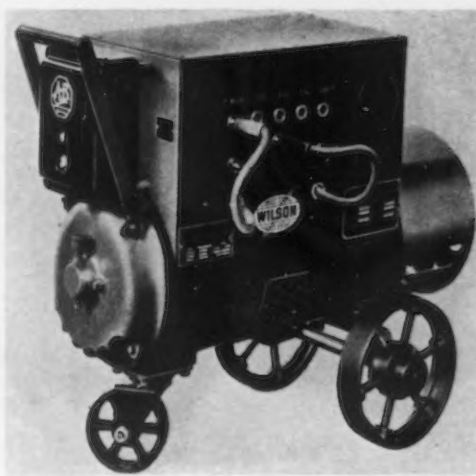
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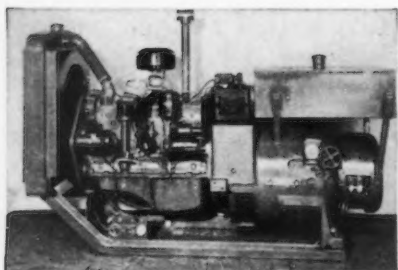
ALSO for light-gage welding, G-E offers this 150-amp. single-operator, portable d.c. arc-welding motor-generator set, with 25-volt output.

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WILSON Model SC single-operator, motor-generator arc welder, of 30-volt series variable voltage and 100-amp rating, is recommended by its maker for thin-gage production work.





WESTINGHOUSE FlexArc model SFA arc welder of 200-amp. capacity for field and rural service where power supply is not available.

wire and are recommended for making tool steel cutting edges on medium carbon steel or for rebuilding worn tools and dies. The analysis of the deposited metal is comparable with high speed steels, but the metal also has air hardening properties giving hardness values in excess of Rockwell 60 C without any subsequent heat treatment. This electrode is used positive, with the work negative, and it comes in sizes from 3/32 to 1/4 in. diameter for use with currents from 30 to 265 amp., respectively.

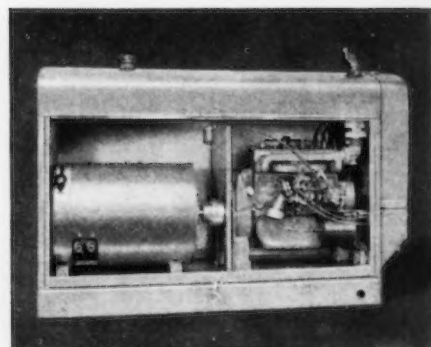
MUREX FILLEX is a heavily coated electrode for manual arc welding announced by *Metal & Thermit Corp.*, 120 Broadway, New York. It is intended for fillet welding and other downhand work. Welds made with this electrode have physical properties meeting the American Welding Society's specifications for

Grade 10 filler metal. The supplier stresses low cost of deposited metal and claims that when used at unusually high amperages, Fillex will not undercut, thus allowing operators to increase output appreciably.



THE IPCO No. W-700 chrome leather welding helmet with flip front is designed for electric welding in tight places where the conventional type of shield requires too much space.

SOFTWELD, a product of the *Lincoln Electric Co.*, Cleveland, is a heavily coated, shielded arc, non-ferrous alloy electrode designed for depositing a soft, machinable alloy on cast iron. Two layers are generally deposited in the weld zone, and the



THOUGH stationary in standard form, the P & H Hansen 200 amp. "Special" engine-driven welder may be had with two-wheel pneumatic tire running gear.

entire area may then be machined without difficulty. This electrode is made in only one size, 5/32 x 16 in., and an average of 90 amp. and 18 volts at the arc is recommended. Softweld operates best with d.c. negative polarity, although a.c. may be used. The alloy flows over and bonds to the cast iron with a minimum of penetration or heating of the base metal. The weld metal is peened after depositing, following which the slag may be readily removed by wire brushing.

Welding Helmet

FOR protection against arc welding in close quarters, *Industrial Products Co.*, 755 W. Somerset Street, Philadelphia, is supplying the No. W-700 helmet, manufactured of selected chrome leather on a vulcanized fiber head-gear. The latter is form fitting and is adjustable for various head sizes. The chrome leather hood extends down the back and front and is well suited for extreme heat conditions and high arc intensity. In the flip front, two kinds of dark shades can be mounted, either No. 10 or No. 12 Willson-Weld, the latter for arc weld-



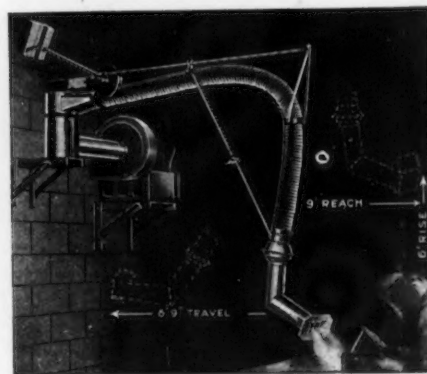
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UNIVERSAL movements make it possible to make all welds in a horizontal trough with this Cullen-Friestedt welding positioner recently placed on the market.

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ANEW fume collector has been designed by the Ruemelin Mfg. Co., 3860 N. Palmer Street, Milwaukee, to remove the irritating gases, smoke and heat caused by arc welding. The unit shown covers a 9-ft. semi-circle and collects the fumes at their source rather than exhausting the entire shop atmosphere. The inlet and hose are counterweighted and held in any operating position by a friction wheel and rods. The motor-driven exhaust fan delivers the fumes out-of-doors. A hinged type is also made that reaches out 16 ft. from the building wall.





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MODEL E a.c. transformer type electric welder, made by the Hampton Electric Tool Co., 700 Walnut Street, Pittsburgh, has a welding range of 20 to 280 amp., obtained by single dial control, to supply any electrode from 1/16 to 3/4 in. By interchanging a copper bar, the unit may be operated on either 110 or 220 volt primary circuit. A stabilizer in the secondary windings of the transformer controls and balances amperage and voltage across the arc, thus decreasing spatter and insuring a homogeneous weld. The coils are of ample capacity to permit a safety factor on overloads, the rating being 150 amp. for continuous service. Emergency overloads are indicated by a thermostat that flashes on a red light. This portable unit measures 13 x 20 in. by 23 in. high.



APPlicable for use with either the W-17 or W-22 Oxweld welding blowpipes, this type CW-23 Oxweld cutting attachment will cut any thickness of steel up to 8 in. An improved injector principle is said to give an exceptionally accurate control of gases, with equally good performance on either low or medium pressure acetylene.

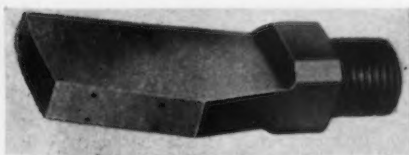
ing operations over 200 amp. The plastic composition glass holder flips up instantly, exposing a clear glass shield in the stationary holder which protects the eyes when wire brushing or cleaning is done.

Aids Flash Welding

NO. 2 metal coating is a white pigmented, water soluble compound for application to the jaws of flash welding machines to keep them from loading with weld spatter. A product of the Wayne Chemical Products Co., Copeland & M.C. R.R., Detroit, it is usually sprayed on the jaws by a spreading type nozzle, then allowed to dry. It quickly forms a tough coating to which the spatter will not readily bond. No. 2 metal coating also acts as a flux and gives a more uniform weld on all automatic ring welding operations. The welded seam is more uniform and there is less tendency for the rod to short out, thus requiring repairs by hand.

Gas Welding and Cutting Apparatus

ANUMBER of new developments in apparatus for gas welding and cutting have recently been announced



SIX-FLAME tip for Lindewelding pipe lines by the rolling method. The four lower flames preheat the V, the upper end flame preheats the welding rod and the lower end flame does the actual welding. There is also a four flame tip for position welds, with only two preheating flames for the V.

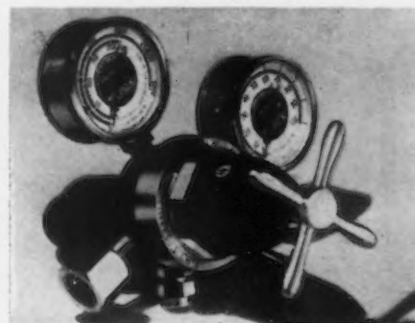


THE type CMP-2 portable medium pressure acetylene generator, offered by Linde Air Products Co., takes eight cakes of Carbic processed calcium carbide at a single charge and yields approximately 80 cu. ft. of acetylene from them. A feature is the rubber sealing cone, which automatically seals off the cake holder from the water shell when the generator is not in use.

by the Linde Air Products Co., unit of Union Carbide & Carbon Corp., including four and six-flame tips for pipe line construction by the Lindeweld process for which increased speeds of 25 per cent or more and a corresponding reduction in gas consumption are claimed; a new oxy-acetylene cutting attachment for shops where the amount of cutting does not justify the purchase of a separate cutting blowpipe; a portable acetylene generator, developed for the user of small quantities of acetylene for welding and cutting; and a new line of two stage pressure regulators for both oxygen and acetylene. These various units are all illustrated.

Soldering Flux

ANEW non-corrosive soldering flux for brass, tin, bronze and copper, designed primarily to meet the needs of fast soldering on a mass-production basis, is now being marketed by the Ohio Carbon Co., 12508 Berea Road, Cleveland. It is stated to penetrate the joints thoroughly and quickly, and was originally developed by the company for use on a specially difficult soldering problem in its own manufacturing processes where the job had to be unusually good and be capable of resisting corrosion under severe humidity conditions. The company states that the use of this flux has practically doubled the speed of production.



THE type R-201 Purox oxygen regulator, made by Linde Air Products Co., is for ordinary welding and light cutting. There is also a heavier duty model, type R-202, and an acetylene regulator, type R-203. All three types have two stage regulation, a fixed first stage for reducing the cylinder pressure to a moderate figure, and a second stage set by the capstan wheel in front of the bullet-shaped nose.

Cutting Tool Action

Studied by

Motion Pictures

DISCUSSION of some of the aspects of metal cutting tool action revealed by motion pictures taken through a microscope featured the first meeting of the educational group of the Cincinnati chapter of the American Society for Metals, held recently at the Hotel Alms, Cincinnati.

At this meeting, which was the initial one of a series to be held monthly, Hans Ernst, research director, Cincinnati Milling Machine Co., was leader of the discussion. It is his interesting remarks that are reported briefly below by M. Martellotti, who is research engineer of the Cincinnati com-

pany and also chairman of the Cincinnati chapter's metal cutting group.

"We have learned a great deal about feeds and speeds," said Mr. Ernst, "but in order that we may meet the increasing demands of modern production for greater output and higher quality of finish, it is necessary that we obtain a clear understanding of what takes place at the cutting edge of the tool."

After mentioning some of the misconceptions of cutting tool action, Mr. Ernst began to unfold the story of what the recently-taken motion pictures show of the process of the formation of three types of chips at the edge

of the cutting tool. These types of chips he classified as follows:

- 1—Discontinuous chip.
- 2—Continuous chip, with continuously escaping built-up edge.
- 3—Continuous chip with built-up edge adjacent to the tool face.

Discontinuous Chip Most Easily Disposed Of

The type 1 chip, which is most easily disposed of, is formed by segments. The pitch of these segments depends upon conditions of operation and the material being cut. Conditions which favor the formation of the type 1 chip are: Brittle material; large chip thickness; low cutting speed; and small rake angle. Where the pitch of the segments is small a good finish is produced on the workpiece. With this type of chip, tool failures occur by a rounding over and wearing away of the cutting edge.

Continuous Chips, with Continuously Escaping Built-Up Edge

The type 2 chip is obtained when machining ductile materials and it is characterized by the absence of the built-up edge. Conditions which promote the formation of the type 2 chip are: Ductile material; small chip thickness; high cutting speed; large rake angle; keen cutting edge; optimum temperature at the tool point; and minimum opposition to chip flow over the tool face. When high quality of finish is desired, the type 2 chip should be the goal.

With the type 2 chip, tool wear occurs partly by abrasion of the face close to the cutting edge, and partly by



FIG. 1—Built-up edge on high-speed steel tool cutting S.A.E. 3115 steel. Magnification: 100X.

a rounding over and wearing away of the cutting edge itself.

Continuous Chip with Built-Up Edge

The chip designated as type 3 is obtained particularly when machining low-carbon steel with high-speed steel tools.

Because of the high friction between the material of the chip adjacent to the tool face, and the tool face, a layer of material usually remains anchored to the tool face to form a built-up edge, while the body of the chip shears away from it and passes off above, as shown in Fig. 1. From Fig. 1 it can be seen that the layer of material adhering to the tool face in the portion near the cutting edge is still continuous with the workpiece; thus each increment of the latter causes an additional piling up of compressed material in this region. The grains of the material are elongated in a direction substantially parallel to the tool face.

This built-up edge, as it increases in size becomes unstable and when failure occurs, fragments thereof are torn off and escape both with the chip and workpiece. These fragments constitute the so-called roughness of the machined surface.

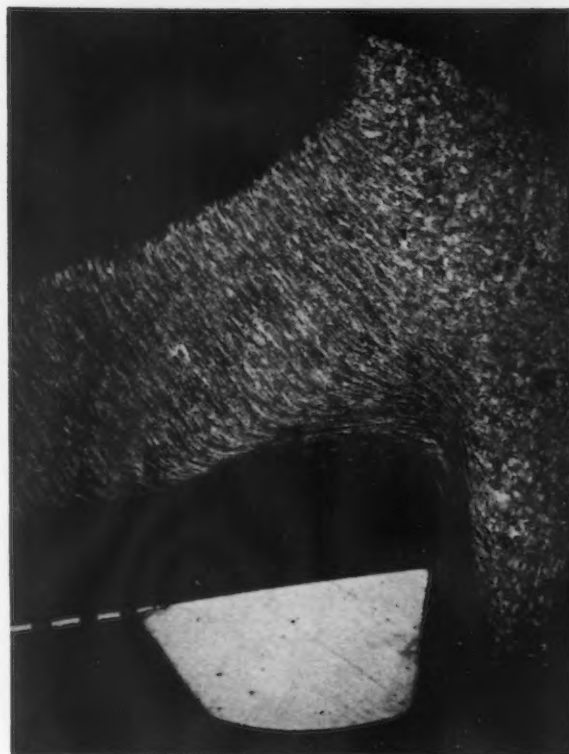
At the end of the cut, when the chip leaves the tool, it usually carries with it the remnant of the built-up edge which has been anchored to the cutting edge. Under certain conditions, however, the bond between this remnant and the tool face is so great that it remains permanently attached to the tool as shown in Fig. 2. This is the condition generally referred to by shop men as "build up."

How Wear Occurs

With the type 3 chip, tool wear occurs both by cupping or cratering of the tool face a short distance back from the cutting edge at the point of contact with the chip, and by abrasion of the tool flank due to contact with the fragments of built-up edge escaping with the workpiece. With continued use of the tool, the crater extends closer and closer to the cutting edge until failure occurs by spalling or splitting off a portion of the material in this region. The finish produced under the conditions producing type 3 chips is poor, due to the presence of the fragments of the built-up edge.

While one particular type of chip is most likely to be encountered with one material under different operating conditions of chip thickness, temperature,

FIG. 2—Built-up edge and fragment of high-speed tool steel attached to type 3 chip. The material being cut is S.A.E. 3115 steel. Magnification: 100X.



lubrication of tool face, etc., we may change from one type of chip to the other even though the work material remains the same.

Effect of a fluid on the formation of the chip and the finish obtained when the workpiece is machined under different temperatures was also shown by motion pictures, and in concluding his talk, Mr. Ernst pointed out that although a better picture of chip formation under various conditions can now be formed, much additional work must be done before optimum results in ma-

chine output, finish, and tool life can be assured.

The meeting was well attended and featured active discussion of Mr. Ernst's address. The second meeting of the group, at the plant of the American Tool Works Co., Cincinnati, was devoted to "A Turning Demonstration of the Effect of Alloys, Grain Size and Heat Treatment of Steel on Their Machineability." Alfred Kullman, assistant works manager of the American Tool Works Co., was the principal speaker at this meeting.

Crane Co. Opens New Laboratories

CHICAGO.—The new research laboratories at the Chicago plant of the Crane Co. were opened last week. Testing and experimental equipment of the very latest types have been installed making it possible to control Crane products from raw materials to the finished work.

The main divisions of the laboratories are metallurgy, welding, radiography, industrial products, ceramics, sanitation and hydraulics, heating and air conditioning, basic sciences, photography, library, design and development, and works laboratory.

Of particular interest is the "creep"

study room where a battery of individual controlled test units, when completed, will make possible 88 simultaneous tests in 22 individually controlled furnaces operating in a constant-temperature, air conditioned room. In tests on this equipment, direct telescopic measurements of creep strain are made daily throughout test runs lasting thousands of hours. Such measurements are reproducible to 1/20,000th part of an inch.

Howarth Pivoted Bearings Co., Ontario and 23rd Streets, Philadelphia, has opened an office and factory at that address, where it will manufacture an extensive line of oil film bearings of thrust and journal types. H. A. S. Howarth, who heads the new company, for 24 years was associated with Albert Kingsbury, inventor of Kingsbury thrust bearings.

THIS WEEK

ON THE

ASSEMBLY LINE

By W. F. SHERMAN
Detroit Editor

... Auto production is boosted, with heavy schedules set for December and January . . . 100,000 car weekly output is on the way . . . Plymouth increasing tooling for coil spring front suspension units . . . Strikes break again in Michigan just after election.

DETROIT.—Automobile production schedules were boosted last week as 1939 model cars were acclaimed at the opening of several auto shows across the country. Optimistic notes were sounded in the face of the first rumblings of renewed labor trouble. But labor's outlook was clouded by reversals suffered at the polls and a wide-open split in the national CIO organization that cannot help but have a noticeable effect on the organization of the United Auto Workers Union.

The outlook for the next 90 days is definitely brighter, despite the somewhat threatening labor attitude.

Faced with evidence of a demand far in excess of earlier expectations, the automotive industry is moving forward decisively in a production way in an effort to keep up with the mounting banks of orders, which mean that in some cases production is sold out into January or even February.

Buick Revises Schedules Upward

At Buick, for instance, an upward revision of some 50,000 units in the estimated output of 1939 cars launches that company on the biggest manufacturing program in its history. Originally, Buick officials estimated the 1939 prospects at something between 185,000 and 210,000 cars, but Harlow H. Curtice, president and general manager, now estimates that sales for

Buick will be 50 per cent greater than last year, not just 25 or 35 per cent.

"We have raised our 1939 model index to 260,000 cars, of which 240,000 are expected to be required for domestic consumption, with export and Canadian shipments requiring at least another 20,000," he said. A total of 28,615 cars is scheduled for production in November, 27,288 in December and approximately the same number is now estimated for January.

In the same class, Lincoln-Zephyr output has been stepped up 50 per cent, with two increases in schedule since the 1939 models were brought out less than a month ago. Despite the increases, production is reported far behind the mounting volume of retail sales. A statement by A. S. Hatch, in charge of Lincoln and Lincoln-Zephyr sales, bears out some paragraphs written in this column a few weeks ago.

"Our schedules are based on the long term outlook more than on orders in sight," Mr. Hatch said. "In other words, we are trying this year, as we did last, to hold production down to a level that we can reasonably expect to maintain through much of the winter, rather than opening up full blast now being obliged later to curtail operations sharply a few weeks from now."

Pontiac Also Expanding Output

Pontiac has revised its production schedule upward more than 100 cars

a day. This program will yield 20,300 cars this month, compared to 13,000 last November, but Harry J. Klingler, general manager, predicts that there will be more unfilled orders by Dec. 1 than the company has had at any time in the last six years. At the same time he publicly pushed up the Pontiac estimate and 1939 model goal from 125,000 units to 200,000. There will be a further increase of production in December to about 22,000 cars and another increase in January to about 23,000 if prevailing conditions continue. As an aside, however, it may be noted that tentative plans have been made for dropping to 17,000 units in each of the months January and February. Last year in the two months combined only 8900 cars were built.

Upward revision of Ford production is expected beginning with the "budget" which starts Nov. 21. Chrysler units are pressing hard to get greater production. Dodge has revised its daily schedules upward from 800 cars to 1000 cars, effective last Friday, and will work five days a week at the 1000 car rate. Plymouth is hampered in its effort to get above the 11,500 car mark (weekly output) because it cannot produce enough coil spring front suspension units to supply the assembly plant with all the parts that are needed. The plant at Newcastle, Ind., is the bottleneck in production, but Plymouth is making a valiant effort to tool up for another 900 sets of units a day. When it does, Plymouth assemblies should jump to 3200 a day (16,000 a week) and it is understood that a market is waiting for the plant's full production. It has not been learned whether the new equipment and tools will be placed in the Dodge plant at Detroit or in some outside

Here are two of the many machining set-ups. Notice how simple the fixtures are, and how easy it is to change over from one job to another. That means fewer machines—but all of them working all the time. Excellent machine design makes it easy to adapt simple fixtures for complicated jobs, as our engineers can show you. We'll be glad to help tool up your work.

Here is part of a complicated assembly of die castings, with the main parts fitted to limits of $\pm .001"$. It is made in large lots by an eastern manufacturer with a reputation for quality. After much study and testing, Pratt & Whitney Vertical Millers and Profilers were picked for the job.

**“ and the
P&W machines did a
remarkable job”**

THOSE were the plant superintendent's own words after his shop had been in production on these parts for some time. He was mighty proud of the job, and rightly so. Kind things had been said by the management, and he was big enough to pass on some real credit to the quality machines he had.

And Pratt & Whitney machine tools are quality jobs—built to high precision standards, with the stamina to hold their initial accuracy through a long and useful life. Put your milling work on Pratt & Whitney Vertical Millers and Profilers and watch production smooth out at a high level. Write for complete information.

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Miller and
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plant, but a week or 10 days should determine this.

During the past week, the industry's output passed the comparative week of 1937 for the first time this year. According to Ward's Automotive Reports, production totaled 86,300 cars and trucks, compared with 83,325 in the same week of 1937 and 80,030 last week. In this, the eighth week of steadily increasing output in the automobile industry, it was predicted that production soon would exceed 100,000 cars a week. General Motors, during the last week, increased production to 42,100 units, against 39,308 the previous week. Chevrolet gained 2500, reaching the 25,000 mark. Chrysler increased from 18,250 to 20,350, with Plymouth accounting for 200 of this increase. Ford-Zephyr volume was up to 13,450 from 12,250 the previous week. Gains were also noted among the independents.

Fresh Labor Troubles

While industrial leaders agree that the conservative swing manifested in the Nov. 8 elections, particularly in Michigan, has improved the industry's position, a considerable volume of

labor trouble is already apparent. While the UAW maintained an unbroken peace for several weeks prior to the election, the votes had hardly been counted when Detroit witnessed the closing of two plants, with another ready to close.

The Packard Motor Car Co. plant was shut down at noon last Friday because of a shortage of automobile body doors caused by a strike at the Budd Wheel Co. and the Edward G. Budd Mfg. Co. The Budd strike was precipitated Thursday and switches were pulled because the Budd Wheel Co. discharged two shop stewards who were said to be circulating petitions for an election to establish the UAW as sole bargaining agent. Something like 400 of the 2000 Budd workers returned to work Friday morning but the company was unable to maintain production with the limited force. The plant supplies Packard, the Dodge division of Chrysler Corp. and the Ford Motor Co. Part of the Packard difficulty was caused by the fact that UAW members at Packard refused to unload two truckloads of doors delivered by Budd trucks under police escort, it was said.

The threatened strike at Hudson

arises from the inability of the UAW to negotiate a new contract with Hudson officials to replace the one which expired last spring. The executive board session of the UAW meeting at Pittsburgh Friday night voted approval of the Hudson strike. Homer Martin immediately flew to Detroit to be on the scene but declared that whether a strike is called is up to the local union.

Warning Against Sit-downs

Governor-elect Frank D. Fitzgerald, who defeated Governor Frank Murphy in the recent election, took the initiative immediately after election in bringing about fulfillment of his principal campaign promise—no sit-downs. He has announced that before he takes office, Jan. 1, he will call Michigan labor leaders into conference and make his position clear to them.

Industry's attitude and expectation is put into words concisely by W. E. Holler, general sales manager of the Chevrolet division. In New York at the opening of the National Auto Show he is reported to have told newspaper men that:

"The victory of Frank D. Fitzgerald should have a beneficial and sobering effect on labor. We expect minor interruptions in plant activity, largely due to the efforts of CIO unions to increase their membership and collect dues."

Swedish Engineers Society of Detroit Meets

DETROIT.—The Swedish Engineers Society of Detroit, Inc., met Wednesday, Nov. 9, at the Chrysler Jefferson Avenue plant as a guest of D. A. Wallace, president, Chrysler Sales Corp. Dinner was served in the Chrysler executive dining room. Tore Franzen, Chrysler Corp. experimental engineer, was master of ceremonies, introducing Mr. Wallace who spoke on "Superfinish and Why it Eliminates Wear."

Weir Gives Away Clarksburg Plant

WEIRTON STEEL CO. has given its idle Clarksburg, W. Va., plant to the Clarksburg Chamber of Commerce. The plant, the first unit in the development of the Weirton company and its parent organization, National Steel Corp., has been made unprofitable in recent years by high freight charges and other factors.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



Tool Engineers Show Reservations Rise

TWO weeks after the first official announcement, and four months prior to the opening of the 1939 Machine and Tool Progress Exhibition at Detroit's Convention Hall, reservations for exhibit space have already passed the total exhibits of the first show.

Most of the space so far, according to Ford R. Lamb, executive secretary, American Society of Tool Engineers, sponsor of the show, has been taken by last year's exhibitors.

"As a matter of fact," Mr. Lamb stated, "we have not sent out reservation blanks as yet except to those companies who exhibited last year or who did not manage to get ready in time for last year's show. This year we decided to start early so as to give manufacturers more time to develop operating exhibits of interest to tool engineers. We hardly expected, however, that the influx of space reservations would be so rapid. At this rate, all available floor space would be gone well before January first—in spite of the fact that three times as much space will be available as last year."

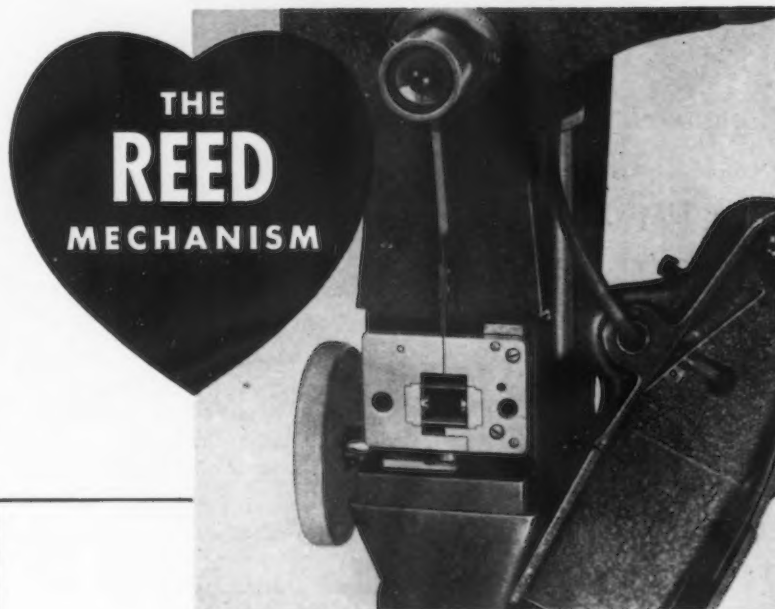
A feature of the show this year, not provided last year, will be a pre-view of the show for invited guests only. According to Walter F. Wagner, Lincoln Motor Car Co., president of the society, special invitations will be sent out to leading industrial executives, editors, economists, etc. The show is being held coincidentally with the annual convention of the A.S.T.E.

Goodyear to Build Plant in Brazil

CLEVELAND.—Goodyear Tire & Rubber Co. announces it will build a manufacturing plant in Sao Paulo, Brazil, capable of producing 600 tires a day, together with a limited line of other rubber products. Production will serve the Brazilian market only and will utilize raw materials from that country. This is Goodyear's second plant in South America and its ninth in foreign countries. Goodyear has been making tires in the Argentine for several years.

Brown & Sharpe Mfg. Co., Providence, R. I., arranged a special exhibit of machine tools, small tools, cutters, pumps and miscellaneous shop equipment in connection with the A.S.M.E. meeting held recently at Providence.

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NITRIGAGES

GAGEMAKERS

THIS WEEK IN WASHINGTON

... Comeback of Republican party considered boon to business ... Election results may end "cracking down" ... War Department expected to expand defense educational orders during 1939.

By L. W. MOFFETT

Resident Washington Editor
The Iron Age

WASHINGTON. — The stunning upset given the New Deal at last week's mid-term elections is hailed as most encouraging to business. It feels that the sharp Republican gains both in Congress and in state government will check prevalent radicalism, and that two years hence there will be a more conservative administration in charge of the Federal Government, whether under the Democratic or Republican party.

It is contended generally that the returns did not reflect a party trend so much as they scored a decisive protest against the New Deal, its revolutionary policies and alliances. This is not to say, however, that a two-party system has not been restored after six years of complete domination by the nondescript New Deal party, masking as the Democratic party. In reality the returns mean that the Democratic party as well as the Republican party has come back to life.

Experimentation to End

The coalition of the two parties plainly will check the New Deal's strange and alarming experimentation both administratively and legislatively. Reform will continue but it is expected

that conservative forces in the next Congress, made up of Democrats and Republicans, will bring to an end rubber stamp legislation.

Measures before Congress will be studied and made sounder before passage, and not railroaded through by Administration order, regardless of their sweeping social and economic implications. It may be expected that there will be no further attempt to jam on the country such measures as the Court "reform" bill, and other radical legislation designed to centralize Government in the White House. Efforts to push through the Court bill having been defeated when the President had almost complete control over Congress, it is certain that, if renewed, as might have been the case in the event of a New Deal victory last week, would be given short shrift at the hands of the incoming Congress. So it is with respect to efforts that may be made for further regimentation of business, and greater centralization of Government. Relief from cracking down on business may be looked for.

May Feel Resentment

The Administration may, out of resentment at its defeat, strike at business through the so-called monopoly investigation or other means so long as it has funds to proceed with but sooner or later it would have to halt its attack if Congress denies it appropriations or legislation to continue, as may well be the case. Outwardly at least, however, the Administration took its defeat calmly and manifested no revengeful mood.

The balance of power is being re-

established, not only of party power, but of Government power, as between its three branches, with the restoration of the checks and balances.

One highly important development hoped for and predicted by some students is a quick end to the enormous orgy of wild spending, much of it of a political character, that raised such a stench as to become a campaign issue. This was a determining element in the election results. Forecasts are made that Congress will no longer give the President carte blanche use of billions upon billions of dollars but will lay down or attempt to lay down itemized specifications for their expenditures and see that instead of being constantly increased they will be toned down and a real and not merely a promised balance of the budget is achieved.

Townsend Republicans

But it is to be kept in mind that a considerable number of incoming Republicans are of a pseudo character who out New Dealed New Dealers in making utopian promises of the more abundant life. Some of them even out-Townsend Mr. Townsend in promising to support weird pension plans. It is difficult to see how, if they are bothered by the matter of consistency at all, they can do much in urging slashes in expenditures.

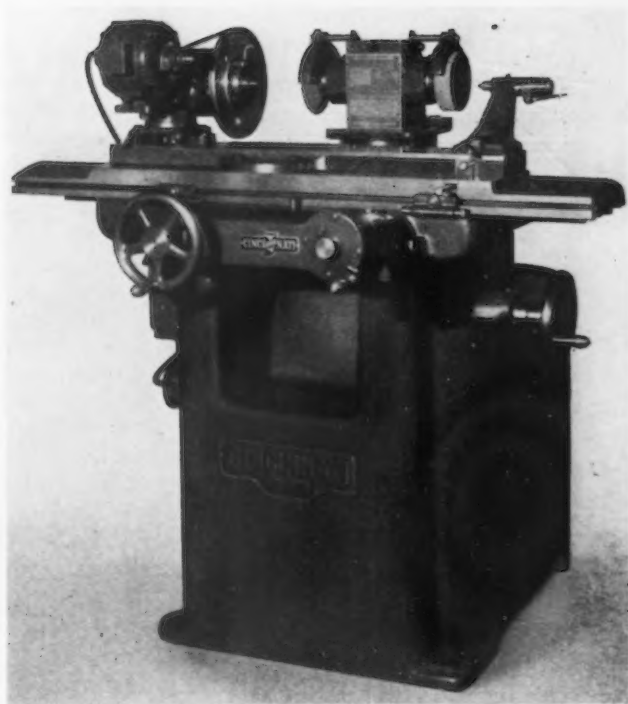
Whether or not the drive to amend the National Labor Relations Act will succeed remains to be seen. It is certain that there is a much better chance of revision than previously and of replacing the National Labor Relations Board with a more fair-minded personnel than the present one, with its CIO bias. The AFL will lend its influence toward both plans.

A factor in the election was the labor situation, which had become so disturbing to business and the outcome was a blow at the CIO, emphasized particularly in the Michigan returns where Frank Murphy was defeated by overwhelming vote for reelection as governor. Murphy, who was a particular White House favor-

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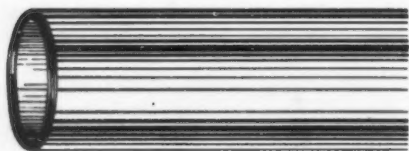
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ite, went down to defeat largely because of his coddling of the CIO and sufferance of the sit-down strike.

CIO Influence Fades

The impotency of the CIO in the campaign was remarkable, even as viewed by those who gave its influence a low rating.

President William Green of the American Federation of Labor said:

"The CIO and its political dummy, Labor's Non-Partisan League, were routed in the election on all fronts. The voters turned against every candidate who gave air or comfort to the CIO leadership, even in states where the CIO concentrated its campaign. By this time the proof is overwhelming that the American public is sick and tired of the tactics and philosophy of the CIO."

President Roosevelt's reaction to the election returns, as relayed by him to correspondents at a press conference last Friday, was that the election constituted no threat to a continuation of a liberal Government. Forecasts made by him, he related, did not turn out so bad. He had the New York results lined up about as they turned out, predicted there would be a loss of seven Senate seats, and a net loss of 65 seats in the House. This compared with eight seats lost to Democratic ranks in the Senate and 81 in the House.

But Mr. Roosevelt characterized the results as satisfactory and added, in response to a further question, that he thought he would not encounter any increased opposition in Congress. Said a correspondent:

"I do."

U. S. Likely to Expand War Educational Orders in 1939

WASHINGTON.—The War Department's \$10,000,000 educational order program was well under way this week when officials completed the job of sending out circular proposals on five items called for under the first year's schedule contemplating the expenditure of \$2,000,000. At the same time, THE IRON AGE was told by Assistant Secretary of War Louis Johnson, key man in the Government's industrial mobilization plan, that an expanded educational order system would be recommended to the next Congress. The extent of the proposed expansion was not given but there were indications, based on experience developed under the current undertaking plus the trend toward an enlarged rearmament project, that it would be substantial.

The circular proposals cover these items: U. S. caliber, 30 m. (semi-automatic) rifles; 3 in. A.A. gun, recoil mechanism; forging, 75 mm. shell; machining 75 mm. shell; and gas masks. Proposals on the 60 in. searchlights will follow. Orders for these items will not be placed before Jan. 1.

Field Representatives

Thus far the program, designed to familiarize industrial firms with the Government's wartime requirements in an effort to speed up industrial pre-

paredness, has been handled largely from Washington but after orders are placed, representatives from the Ordnance Division's 14 branches will be placed in the field to contact firms receiving contracts. The program is described by officials as a new departure in Government efforts to fill the gap in the industrial mobilization picture as envisaged under the National Defense Act of 1920.

Since that time, Army officers have inspected more than 20,000 industrial plants, 10,000 have been earmarked for war production and plant managers have been advised of specific assignments. The Army also has solicited metal-working plants, seeking assistance in the design of technical munitions in a move aimed at standardizing component parts in the interest of mass production. In addition, thousands of other plants, whose jobs will be to fill in during an emergency, have been cataloged and will be trained along specific lines with the rest to a much greater extent than ever attempted before.

Among the organizations cooperating with the department are the American Iron and Steel Institute and the National Machine Tool Builders Association. The former group has prepared a steel mobilization plan, listing the country's steel plants, their ca-

capacity, types of steel manufactured, and other information for finger-tip reference. The War Department's planning branch is currently compiling information furnished it by the National Machine Tool Builders Association.

Sabotage Defense Planned

Plans have been developed for coping with sabotage in industrial plants working on Government defense contracts but for the most part policing is exclusively in the hands of the individual companies employing their own systems of policing. In such plants, the War Department customarily has men on hand primarily for inspection purposes and in the event sabotage develops reports are made to the Federal Bureau of Investigation. But in no case does the Government plan to step in unless the situation is beyond the control of civil authorities and they make the request for assistance.

Secretary Johnson, who talks in terms of mass production and removing "bottlenecks" in drawing a picture of the department's mobilization plans, emphasizes the necessity of cutting down to a minimum the time needed for changing from peace to war footing. What officials want to avoid most is a repetition of what happened in 1917 when it took this country 14 months to get soldiers and equipment to the front. War Department officials from time to time have expressed concern over what was regarded as the unfortunate tendency among military designers to develop complicated machines not readily adaptable for mass production. In the long run, they believe that what the Army should adopt is what private industry can make best in the minimum time.

Rifle an Example

In the production, for example, of the semi-automatic rifle, which has been characterized in Army circles as unquestionably the outstanding infantry development of the day, is needed 2345 different gages, 1766 different fixtures, 1388 special tools and cutters and 79 punches and dies for the manufacture and assembly of its 74 different parts. Because of the importance of the time element, Army designers are stressing the importance of adopting weapons in so far as possible which can be produced on a volume basis.

Secretary Johnson has classified the industrial mobilization program under these categories: (1) educational orders; (2) adequate power for industrial use; (3) the training of airplane mechanics to correct a shortage; and

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- 3 Reduce costs, which puts you in a better competitive position to get business and so helps you keep up your employment, wages and profits.

How much you and your workmen would benefit by new Warner & Swaseys can be determined by a study of your plant, before you invest a dollar. May we make it?

You can turn it better, faster, for less . . . with a Warner & Swasey



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Turret Lathes
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(4) accumulating stock piles of strategic materials and mapping the railroad's part in a mobilization plan.

Utilities to Expand

The first is considered to be well under way. The second, involving so far commitments from leading utility companies to embark on an expansion program involving capital expenditures of \$2,000,000,000 during the next two years, has been agreed upon. Details of the third plan have not been disclosed. The department's program for accumulating strategic materials is represented by the pending Thomas bill, behind which it has thrown its support. The measure embodies a plan to build up stocks of ferromanganese, chrome, tungsten ores and pig tin from normal foreign sources of

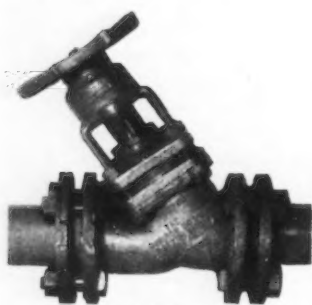
supply sufficient to meet war-time requirements for a definite period.

The possibility of these departments urging passage of scrap licensing legislation is remote, officials pointing out that adequate supplies of scrap iron and steel are on hand and there appears to be little, if any, interest in curbing exports by licensing.

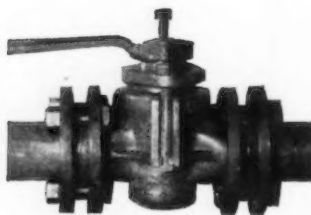
Before the railroad mobilization plan can be developed further officials are waiting for a railroad rehabilitation move by Congress. There have been attempts to bring the War and Navy departments into the existing railroad controversy in the interest of national defense but to date neither has been involved. Officials deny that the program, so far as it has been developed, contemplates Government

operation of the railroads in time of war. While they have shown some skepticism over the question of whether the roads are in adequate trim to shoulder an emergency burden, there has been the intimation that Government operation in an emergency would not be conducive to the greatest efficiency. This thought, it is said, is not based entirely upon the Government's experience during the World War, but because they feel such a step just isn't necessary.

Working closely with Johnson in the industrial mobilization program is Charles T. Harris, Jr., Assistant to the Chief of Ordnance, who has been promoted to Brigadier General; and Col. Harry K. Rutherford, director of the planning branch. Tied into the program with the planning branch is the Navy Munitions Board, headed by Johnson, representing the War Department, and Assistant Secretary of the Navy Edison.



Y Valve



Duriron-Nordstrom

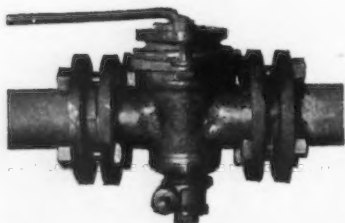
You pay the cost of Corrosion

Theoretically, the customer pays it, because the cost of corrosion is figured in the selling price of the goods you produce.

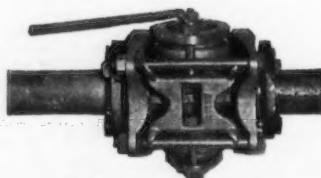
But when maintenance costs go up—replacement expense, lost time, etc.—the cost is usually absorbed—you pay it.

Duriron valves reduce the cost of corrosion because they are corrosion-resisting. They are made *especially* for use with corrosive liquids. Naturally, they cost less per year of service.

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Type 600



"Plunger-Release"

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Copper Smelters' Output Soared in '37

WASHINGTON. — Galvanizing and coating establishments, exclusive of rolling mills, turned out products to the value of \$5 994,070 in 1937, compared with \$5,194,309 in 1935, according to the Bureau of the Census.

Production by copper smelters and refineries last year was valued at \$715,354,577, an increase of 105.4 per cent over the 1935 output which was valued at \$348,257,026.

Lead smelters and refineries turned out products to the value of \$253,597,853 in 1937 compared with \$137,219,290 in 1935.

NLRB Gives Another Decision to CIO Union

WASHINGTON.—Upon the basis of a stipulation agreed to by all parties, the National Labor Relations Board has ordered Moline Iron Works, Moline, Ill., to bargain collectively with Amalgamated Association of Iron, Steel and Tin Workers of North America, Lodge 1449 (CIO), as the sole representative of piece rate and hourly paid employees, according to a board statement. Under the terms of the agreement the company will reinstate 14 workers and place 22 others upon a preferential rehiring list, and will award 31 employees, including the above, about \$2,700 in back pay.

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DESIGN

Thurman Arnold Develops Plan to Curb Advertising

WASHINGTON.—Thurman Arnold, assistant attorney general and energetic head of the Justice Department's anti-trust division, has evolved a new scheme to penalize bigness which, in effect, broadens the anti-trust laws to control advertising without the necessity of

having Congress amend the Sherman Act.

Embodied in the consent decrees signed last week by the Ford Motor Co. and the Chrysler Motor Corp., in which the two companies agreed to discontinue pushing a particular finance company in distributing their

products, is a provision which, the department concedes, calls for something outside the scope of the anti-trust laws—restricting advertising to what Mr. Arnold calls its "proper field."

He suggests that the "proper field" is in the promotion of sales and away from the fostering of monopoly and monopolistic practices and points out that the decrees just signed may become "most important precedents in preventing the misuse of advertising power in other fields." Conceding that the action is unprecedented, the anti-trust division head puts the stipulations forward as essential safeguards against the use of advertising either to produce a wasteful system of distribution, or to suppress competition.

Agreements Voluntary

Specifically, the Ford decree prohibits that company from advertising, recommending or indorsing any finance company by name. It can recommend a financing plan, but going further than that is taboo. Under the Chrysler decree, that company can recommend any plan but if it mentions a particular finance company it must also mention all other companies which also measure up to certain minimum requirements.

Of course, Mr. Arnold emphasizes that the agreements are "voluntary" on the part of these automobile manufacturers but it is recognized that in the absence of consent decrees the alternative would have been to prosecute the two companies. The department has made plans to go ahead with a "vigorous prosecution" of the General Motors Corp., which also was involved in the case but which did not go along with Ford and Chrysler in the civil procedure of signing decrees.

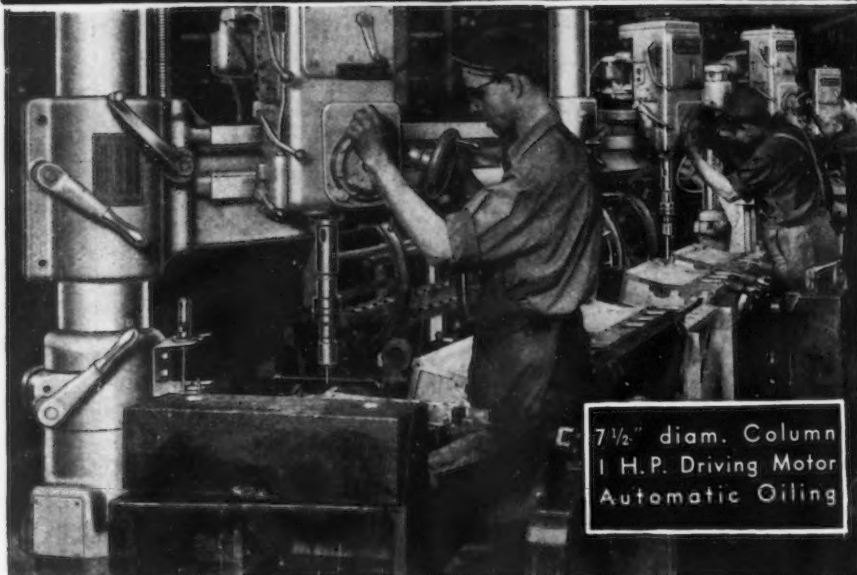
Carried further, Mr. Arnold's scheme would definitely curb the efforts of a large company, with financial resources to advertise on a large scale, to advertise a new mouse trap, thereby erecting a barrier against consumers who otherwise might beat a path to the manufacturer's door.

Apparently turning such possibilities aside, Mr. Arnold who would return America to the oxcart era continued:

"Monopoly is fostered when advertising is used to put competitors at a disadvantage for the sole reason that they do not have resources sufficient to expend equally large sums in advertising particular products or the services of particular companies. . . .

"By a variety of modern refinements upon the methods of the circus barker, advertising is used to build up public

Why Drill Small Holes with **LARGE UPRIGHTS**



This New 2 1/2' Super Service Radial Does the Job **FASTER — EASIER** **MORE ECONOMICALLY**



Here is a new tool for manufacturers whose work includes much small drilling and tapping in fairly large parts—work now being handled on large upright drills or on less efficient belt driven radials of the sensitive type.

The versatility and economy of this simplified radial makes it ideally suited for plants engaged in producing automotive and aircraft parts, agricultural machines, electrical devices, and the like. Its high production, long life features cut costs surprisingly.

Write today for complete details . . . Bulletin R-26.

THE CINCINNATI BICKFORD TOOL CO.
OAKLEY CINCINNATI OHIO U.S.A.

preference for the products of one producer or manufacturer solely because he has the most advertising money and can make the most noise. To meet the monopoly control which this advertising gives, the anti-trust laws by themselves are inadequate. Such a method of advertising (the use of trade names and of pushing particular brands) has never been held to be violative of the anti-trust laws, and the legality of its use, in the absence of positive fraud, has not been questioned.

"Nevertheless, the purpose of the anti-trust laws will be furthered if advertising is limited to its proper function of building up consumption, and if restrictions are placed against its use for the purpose of giving a monopoly advantage to the competitor with the largest pocketbook. Where advertising stresses the peculiar qualities of common goods under a particular trade name, competitors must either go out of business or spend like large sums in building up their own trade names for the same common commodity. The result is either a wasteful system of distribution on the one hand, or monopoly on the other."

Government Buying In Week Ended Nov. 5

WASHINGTON. — Government purchases during the week ended Nov. 5, 1938, totaled \$147,092.96 for iron and steel products; \$102,535 for non-ferrous metals and alloys; \$355,597.46 for machinery; \$518,017.04 for electrical apparatus and supplies; and \$121,030.06 for transportation equipment. The awards follow:

IRON, STEEL PRODUCTS:

Truscon Steel Co., Youngstown, steel sash and doors	\$17,978.00
U. S. Pipe & Foundry Co., San Francisco, cast iron pipe (estimated)	20,196.48
Bethlehem Steel Co., Bethlehem, Pa., girder rail	18,680.00
Hansell-Elcock Co., Chicago, bulkhead gates	23,680.00
Republic Structural Iron Wks., Cleveland, structural steel	30,818.48
Edw. G. Budd Mfg. Co., Philadelphia, fabricated stainless steel ..	23,810.00
Ruff Hardware Co., Inc., Columbia, S. C., shovels	11,930.00

NON-FERROUS METALS & ALLOYS:

Scovill Mfg. Co., Waterbury, Conn., cartridge discs	\$50,535.00
Scovill Mfg. Co., Philadelphia, nickel blanks	52,000.00

MACHINERY:

Davey Compressor Co., Kent, Ohio, air compressors	\$20,447.00
Cleveland Tractor Co., Cleveland, tractors	11,197.14
The Pelton Water Wheel Co., San Francisco, turbines	108,773.00

General Motors Corp., Cleveland Diesel Engine Div., Cleveland, spares for Winton engines	10,751.79
The Lodge & Shipley Mch. Tool Co., Cincinnati, lathes	12,749.00
Pratt & Whitney Co., Hartford, Conn., tool room machines	19,953.00
Bradley Machinery Co., Rockford, Ill., boring mills	41,950.00
Carlton Machine Tool Co., Cincinnati, radial drill	18,940.00
Vandyck Churchill Co., Philadelphia, boring and turning mill	13,476.00
William Sellers & Co., Inc., Philadelphia, boring machine	39,500.00
Allen Wales Adding Machine Corp., New York, computing machines.	Indefinite
National Cash Register Co., Dayton, Ohio, office equipment	Indefinite
Elliott Addressing Mch. Co., Washington, D. C., office equipment ..	Indefinite

Ralph C. Coxhead Corp., New York, composing machines	20,706.00
Warren Steam Pump Co., Inc., New York, pumps and parts	11,755.00
York Ice Machinery Corp., Philadelphia, refrigerating plant	11,004.18
Copeland Refrigeration Corp., Washington, D. C., refrigerators	14,395.35

ELECTRICAL APPARATUS & SUPPLIES:

Delta Star Elec. Co., Chicago, disconnecting switches	\$10,448.00
Allis-Chalmers Mfg. Co., Milwaukee, circuit breakers	29,990.00
John A. Roebling's Sons Co., New York, cable wire and reels	24,316.75
Aluminum Co. of America, Massena, N. Y., electrical conductor.	112,536.69
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa., generators	195,320.00
Westinghouse Lamp Div., Westing-	



**THE PLACE TO BUY
HEAVY FORGINGS**

Standard is a prompt source of supply for heavy forgings whether they be relatively simple like this 5,600 lb. forged ball drop or more complex like the 14,300 lb. forged crankshaft pictured here.

Standard's forgings and castings, too, are made from open hearth steel produced under close metallurgical control in our own furnaces.

STANDARD STEEL WORKS CO.
Subsidiary of the
Baldwin Locomotive Works
BURNHAM PENNA.

STANDARD



Now—We Throw Tradition to the Winds,

The one problem larger than all others that confronts industrial management today is the problem of offsetting the effect of the growth of the non-controllable cost elements. Up to within the past few years management has had within its own control the regulation of hours and wages, and of the overtime required to meet peak production requirements. Up to within the past few years taxation was a minor financial problem.

Today factors outside the control of management have taken these matters out of management's hands. Wages are increasing, hours of work are growing less, overtime costs are becoming prohibitive, material prices are rising—and taxation has become one of the severest drains on the corporate pocketbook.

But one thing is left within the control of management: the cost element of productivity per man-hour or per wage-dollar. This is still the principal avenue to profits; the one and only defense against all of the other uncontrollable and constantly increasing elements of the cost of doing business. What an opportunity this fact affords to the man or concern which has something for industry that will increase its productivity at lower cost!

Realizing this situation, we have thrown tradition to the winds, and shall make no attempt to build the usual type of Annual Review issue of *The Iron Age* this coming January. Rather we shall make the January 5, 1939, number an *Annual Preview* issue, which, editorially will cover briefly and yet critically, the develop-

On January 6, 1938—

—we published, strictly in accordance with tradition, an Annual Review issue of The Iron Age which is still pulling advertising inquiries. It was an issue worthy of the best traditions of the past. Editorially it presented a comprehensive review of the activities of the metal working industry in all its great ramifications during the year that had just ended. From an advertising point of view it carried the sales messages of 557 manufacturers or purveyors of equipment, materials or supplies purchased by this industry. As a reference manual its value has been acknowledged wherever men work metals. Dog-eared copies of this big issue are still being consulted throughout the industry, for it was literally packed with usable information of primary importance.

To Help You Win Tomorrow's Battle!

ments which are even now making the world of tomorrow a more profitable place to live in and to work in than the world of today.

Specifically, this issue will initiate the most helpful and effective editorial campaign ever attempted by any publication, directed toward aiding industrial executives in the metal working industry to exercise the most effective control of production at lower costs. Thereby we hope to take the leadership in a nationwide effort to revive and revivify profit margins.

No greater nor more needed aid can be rendered to our industry at this time. We shall continue this effort throughout the entire year to come, regardless of former editorial precedent and practice!

The 1939 Annual Preview Issue of THE IRON AGE

Have you something to offer the metal working industry that will increase its productivity? A machine, a product or a service that will decrease existing production costs? Or a product or service that will improve quality and thereby increase demand regardless of the established cost-price ratio? Then put your advertising message in the Annual Preview Issue of The Iron Age! It will pay you quick dividends. Space reservations now being accepted. Write direct or ask our local representative to call at once.

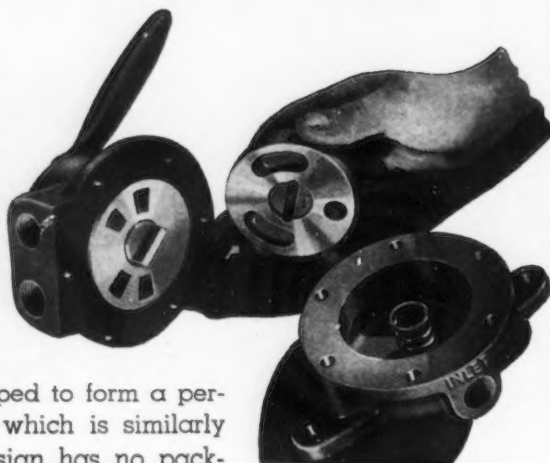
C. S. Baur

General Advertising Manager.



DISC TYPE

*ground and lapped
for a
perfect seal*



The bronze disc of the Hannifin Air Control Valve is ground and lapped to form a perfect seal with the seat, which is similarly finished. This simple design has no packing, avoiding leakage and packing maintenance troubles. It gives positive control of air operated equipment.

Made in 3-way and 4-way types, hand and foot operated, manifold, spring return, electric and special models. Write for Valve Bulletin 34-A.

HANNIFIN MANUFACTURING COMPANY

621-631 South Kolmar Avenue • Chicago, Illinois

ENGINEERS • DESIGNERS • MANUFACTURERS • PNEUMATIC AND HYDRAULIC PRODUCTION TOOL EQUIPMENT

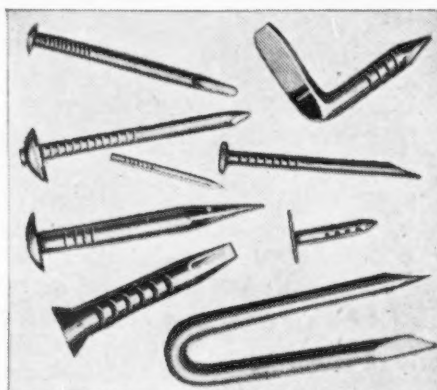
HANNIFIN "Packless" AIR CONTROL VALVES

**10,000
TYPES AND
SIZES**

Continental nails are noted for uniformity—full, well centered heads, sharp points, accuracy of gauge and length. They are made from the most suitable grade of steel for the service involved. Furnished from 3/16-inch No. 22 brads to 10 by 3/8-inch spikes in a wide variety of regular and special finishes and packaged for every class of trade. Write for catalog showing styles and other features. Special nails designed for manufacturers who have unusual needs.

CONTINENTAL STEEL CORP.

General Offices: Kokomo, Indiana
Plants at Canton, Kokomo, Indianapolis



NAILS AND BRADS



CONTINENTAL

STEEL SHEETS AND WIRE PRODUCTS

Wire: Bright Basic, Annealed,
"Konik," Special Manufacturers,
Galvanized, "Flame-Sealed"

Wire Rods, Nails, Staples, Bale
Ties, Barbed Wire, Fence—15
Types, Gates and Fittings

Sheets: Black, Galvanized,
Special Coated, Roofing
and Siding—14 Styles

Trade Mark Registered, U. S. Patent Office

house Electric & Mfg. Co., New York, electric lamps..(estimated)	10,500.00
Westinghouse Elec. & Mfg. Co., Sharon, Pa., rotary converter transformer	10,770.00
Hunter Fan & Ventilating Co., Memphis, Tenn., electric fans and parts	35,831.00
Westinghouse Elec. & Mfg. Co., Knoxville, Tenn., dredge motors and control equipment	22,870.00
Warner Elec. Brake Mfg. Co., Beloit, Wis., electric brakes	66,434.60
Warner Elec. Brake Mfg. Co., So. Beloit, Ill. ....	.....

TRANSPORTATION EQUIPMENT:

Lockheed Aircraft Corp., Burbank, Cal., airplane	\$49,949.00
United Aircraft Corp., Hamilton Standard Propellers Div., E. Hartford, Conn., aircraft propeller blade	16,159.56
United Aircraft Prod., Inc., Dayton, Ohio, regulator assemblies	14,640.00
The Horton Mfg. Co., Bristol, Conn., parachute cord	13,213.50
Adrian Nelson, San Juan, P. R., dump trucks	10,130.00
The Timken-Detroit Axle Co., Detroit, Mich., assembly and brakes	16,938.00

UAW Agrees to Dismissal of Contract Violators

CLEVELAND.—Labor relations of the Eaton Mfg. Co. are expected to be stabilized for the next two years by a general agreement concluded between the company and the United Automobile Workers of America, according to J. O. Eaton, chairman of the company's board.

Homer Martin, UAW international president, said in Detroit that for the first time in UAW history a clause had been inserted under which the company and the union agreed to discipline supervisors and union members for violating the contract, even to the extent of discharging offending workers.

"The agreement," Mr. Eaton said, "covers nine of the Eaton plants, all of which previously had contracts with the UAW, although some had expired several months ago. The effect of the new agreement is to standardize these several contracts and practically to assure the avoidance of strikes during the term of the contract."

The agreement provides for a 40-hr. week and wage rates to be determined in each plant.

Hadley Traces Steel History in Chicago

CHICAGO.—At a recent meeting of the Chicago chapter of the American Foundrymen's Association, Walter E. Hadley, manager of operations, Western district, Carnegie-Illinois Steel Corp., traced the history of the steel industry in the Chicago district, as a preface to the showing of the U. S. Steel technicolor film of steel production.

Manhattan Rubber Is 45 Years Old

THE Manhattan Rubber Mfg. division of Raybestos-Manhattan, Inc., of Passaic, N. J., manufacturer of mechanical rubber goods, this year is observing the 45th anniversary of its founding.

First president of the company was Frank Cazenove Jones, who retired in 1903 to be succeeded by Col. Arthur F. Townsend, now chairman of the board of Raybestos-Manhattan. Three other early executives of the company still active are F. L. Curtis, assistant general manager of the Manhattan division; C. T. Young, factory manager, and Miss Margaret A. Hogan, secretary to Colonel Townsend and the company's first office employee.

Many of the products first manufactured by Manhattan in 1894, including solid rubber buggy tires, clincher type bicycle tires, wagon springs, and horseshoe pads, have become obsolete. The company, now one of the largest makers of mechanical rubber goods, was one of the pioneer American rubber manufacturers to grow plantation rubber.

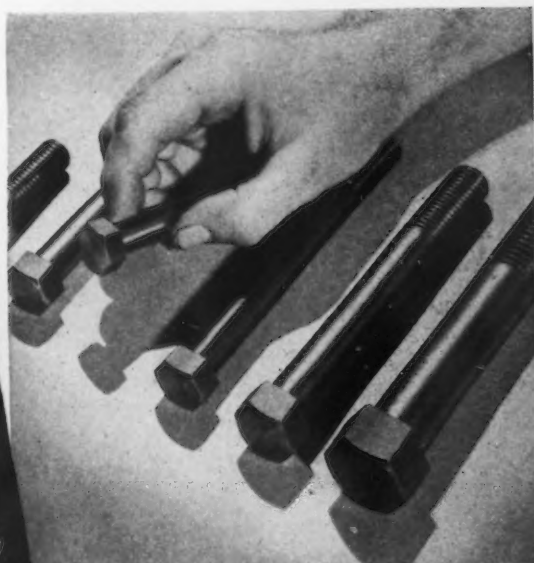
Heppenstall Licenses Canadian Foundries

HEPPENSTALL CO., Pittsburgh, has made an agreement with Canada Foundries & Forgings, Ltd., Welland, Ont., covering manufacture of its die blocks and other drop forge accessory products in Canada. At its forge plant, Canada Foundries & Forgings, Ltd., will manufacture, from Heppenstall alloy steels, Hardtem die blocks, 2C30 piston rods as well as other drop forging accessory products, including rams, trimmer steels, insert steels, etc.

Apex Electrical Expands Cleveland Plant

CLEVELAND.—Apex Electrical Mfg. Co., will spend \$100,000 in an improvement program for its Cleveland plant and will sell the company's California plant, transferring West Coast manufacturing to the Cleveland factory, according to announcement by C. G. Frantz, president. Plans call for the building of a complete new electric clothes washer assembly line, new machinery, tools and equipment for increased and more efficient production of washers.

BY THE BOX OR BY THE MILLION!



• A complete list of sizes of Cleveland Cap Screws in both American fine and coarse threads is stocked at all times in our four warehouses and the factory—in cartons, and in kegs, ready to ship you. All are made by the Kaufman Process, *patented*, which means that extra strength and accuracy of fit goes into every cap screw you get from us. A Class 3 fit is standard. All of our cap screws are full finished—from head to point—washer faces are flat and true. Ask for samples, and send for Catalog E and price list. THE CLEVELAND CAP SCREW COMPANY, 2929 East 79th Street, Cleveland, Ohio.

Address the Factory or Our Nearest Warehouse:

CHICAGO, 726 W. Washington Blvd.
PHILADELPHIA . 12th & Olive Sts.
NEW YORK . . . 47 Murray Street
LOS ANGELES . 1015 East 16th St.

CLEVELAND CAP SCREWS
SET SCREWS • BOLTS AND NUTS



Immediate Shipment from Six Warehouses

Economize without decrease of quality on your water hardened tool applications with Hy-ten "B" No. 5, a .95 carbon water hardening steel. Bars 1/4"-10" round in stock. Forgings of all types.

Send for descriptive folder

WHEELOCK, LOVEJOY & CO., INC.

CAMBRIDGE CLEVELAND CHICAGO NEWARK DETROIT BUFFALO

... THE NEWS IN BRIEF ...

United States Steel Corp. subsidiaries ship 663,287 tons of finished steel products in October, a gain of 85,621 tons over September.—Page 41.

Crane Co. opens new research laboratories at Chicago, exhibits "creep" study room.—Page 51.

Auto production is boosted, with heavy schedules set for December and January—100,000 car weekly output is on the way—Plymouth increasing tooling for coil spring front suspension units—Strikes break again in Michigan just after election.—Page 52.

Swedish Engineers Society of Detroit holds meeting at Chrysler's Jefferson Avenue plant.—Page 54.

Weirton Steel Co. gives away its Clarksburg, W. Va., plant to the Chamber of Commerce of that city.—Page 54.

Goodyear Tire & Rubber Co. announces it will build a plant for making tires, other products in Sao Paulo, Brazil.—Page 55.

Reservations for the 1939 Machine and Tool Progress Exposition at Detroit exceed total exhibits of last year's show.—Page 55.

Comeback of Republican party is found encouraging to business.—Page 56.

Assistant Secretary of War Louis Johnson sees expansion of defense educational orders during 1939 in a statement to THE IRON AGE.—Page 58.

Copper smelters and refineries doubled 1935 output in 1937 production schedules. Lead output increased.—Page 60.

National Labor Relations Board again rules in favor of a CIO affiliate, this time at the plant of the Moline Iron Works, Moline, Ill.—Page 60.

Assistant Attorney General Arnold develops plan to curb advertising for large industries, hits monopolies.—Page 62.

Government purchases of iron and steel products during the latest reported week total \$147,092, machinery contracts total \$355,597.—Page 63.

Automobile union signs agreement with Eaton Mfg. Co., Cleveland, granting company right to dismiss contract violators.—Page 66.

Walter E. Hadley, Carnegie-Illinois Steel Corp.'s Western district operating manager, traces history of steel making in Chicago area.—Page 66.

Heppenstall Co., Pittsburgh, licenses Canada Foundries & Forgings, Ltd. to manufacture die blocks, other drop forge accessory products.—Page 67.

Apex Electrical Mfg. Co. expands its Cleveland plant, offers its California plant for sale.—Page 67.

Manhattan Rubber Mfg. division of Raybestos-Manhattan, Inc., Passaic, N. J., celebrates its 45th anniversary.—Page 67.

Julius P. Heil, Milwaukee business man, who deferted Philip F. LaFollette for governorship of Wisconsin, celebrates by looking for orders.—Page 70.

Two hundred and seventy exhibitors reserve space for 13th National Exposition of Power and Mechanical Engineering.—Page 71.

Welded wire mesh will be manufactured by Republic Steel Corp. with equipment to be installed at the Gadsden, Ala., works.—Page 71.

R. J. Watkins appointed to wage-hours board.—Page 76.

2410 tons of track shipped in October.—Page 76.

General Motors Corp. announces guaranteed annual wage for 1939 in move to provide greater income security for its employees.—Page 77.

David A. Wallace, president of Chrysler Motor Corp.'s sales division, discusses theory of Superfinishing.—Page 79.

Westinghouse Electric & Mfg. Co. builds three generators more powerful than any now in use in the U. S.—Page 79.

Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., buys part of Reading Iron Co. plant at Reading, Pa.—Page 80.

A comparison of ingot output in the Chicago and Detroit districts.—Page 80A.

Index of machine tool orders gains to 118.1 during October with an increase in domestic business offsetting a lower volume of foreign orders.—Page 98.

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MEETINGS

- Nov. 25 and 26—American Foundrymen's Association, Purdue University, Lafayette, Ind.
- Dec. 5 to 9 — American Society of Mechanical Engineers, New York.
- Dec. 5 to 10—National Exposition of Power and Mechanical Engineering, New York.
- Dec. 15—Grinding Wheel Manufacturing Association, Atlantic City, N. J.
- Dec. 16—Abrasive Grain Association, Atlantic City, N. J.
- Jan. 10 to 12—Institute of Scrap Iron and Steel, St. Louis.
- Jan. 9 to 13—Society of Automotive Engineers, Detroit.

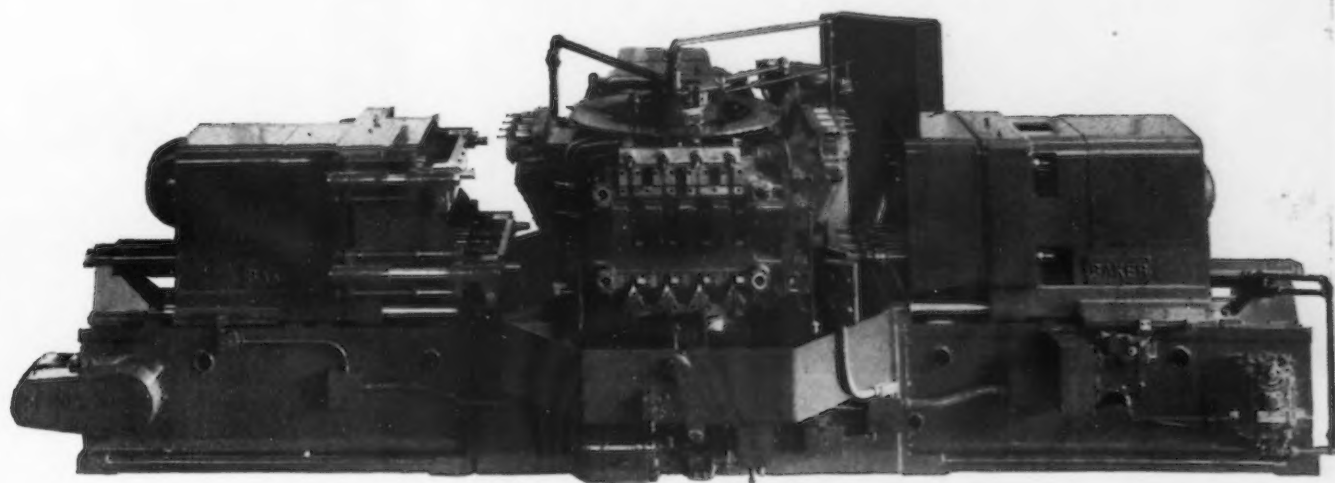
We want your worry!

Any part whose production is a problem in drilling, boring, tapping or reaming can be safely forgotten. We will assume the engineering and development worry and will build equipment to meet your requirements.

The machine illustrated is an example of this kind of service to an automobile manufacturer. Conceived, designed and built in our plant and installed under supervision of our engineers, the machine handles its part of 1939 model production.

For specialized high volume manufacture, our specially designed machines will handle the work. Baker standard equipment offers a wide range of capacities to fit the requirements of any kind of more simple drilling or boring operations.

Your inquiry will get prompt reply. It will cost nothing and is very likely to show you how to make important savings. Baker Brothers, Inc., Toledo, Ohio—New Jersey office, 1060 Broad St., Newark.



Special Baker machine—3-way, 4-station, hydraulic feed, new design bar mounting for saddles. At each station four pieces are chucked in fixture provided with hydraulic clamping. Machine drills, reams and taps two holes in each piece.

★ BAKER ★

Heil, Milwaukee Industrialist, Unseats Gov. Philip LaFollette

AMERICAN industrialists who have been lashed by this country's No. 1 business-baiting body, the LaFollette Civil Liberties Committee, rejoiced this week as the LaFollette name sustained a major political defeat.

Upsetting Philip F. LaFollette, brother of Robert, head of the Civil Liberties Committee, in the contest for the governorship of Wisconsin was a business leader, Julius P. Heil, Milwaukee industrialist known widely in his state as "Julius the Just."

Mr. Heil's victory over Phil LaFollette and his left wing political followers was no triumph won by a hair. Instead "Julius the Just," who is founder and president of the Heil Co., Milwaukee, swamped his opposition with a lead of almost 200,000 votes.

Tells Business "Come Back"

Like Judge Arthur James, newly elected governor of Pennsylvania, Mr. Heil had little to say after the ballots had been counted except a brief, significant message to industry, addressed chiefly to those businesses which have been driven out of Wisconsin by LaFollette rule. It was:

"Come back home." Earlier Judge James had given industries which had

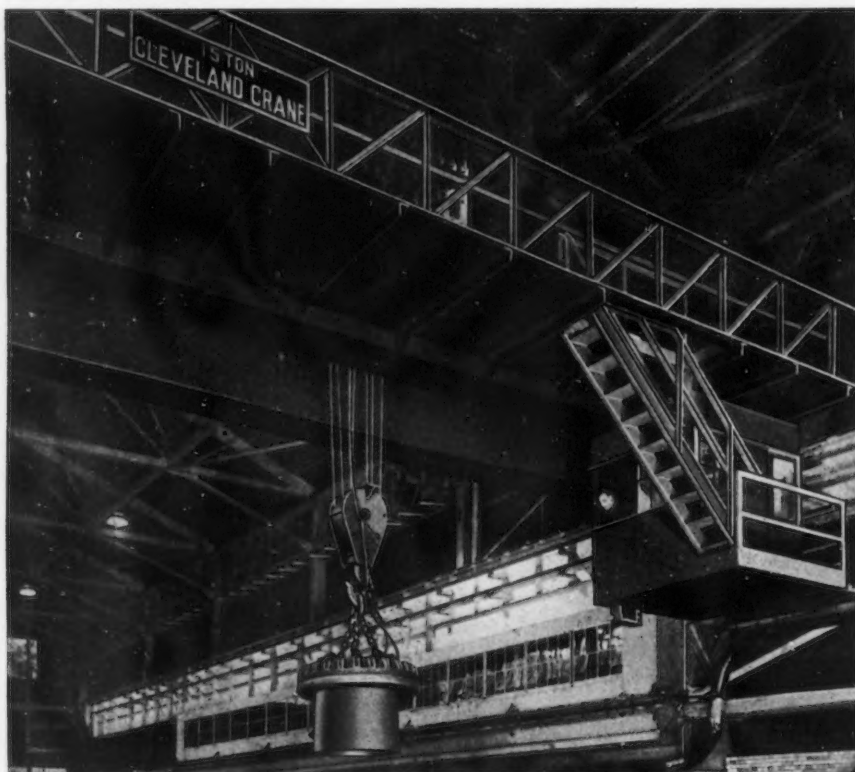
CLEVELAND

All Welded for



CRANES

Every Industry



● A 15 ton 63' 6" span all welded Cleveland Crane in the new Strip Mill of the Jones and Laughlin Steel Corporation. This is one of many Cleveland Cranes in the various plants of this Company.

ALSO BUILDERS OF



THE CLEVELAND CRANE & ENGINEERING CO

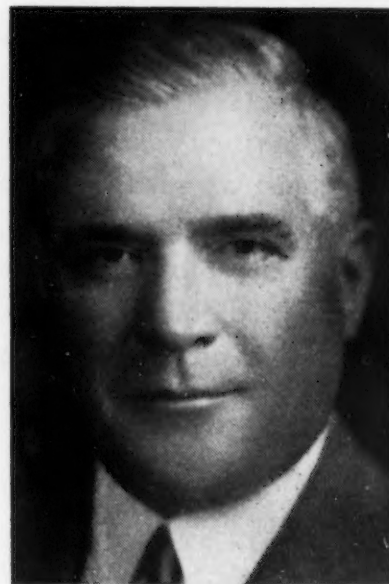
1115 Depot St.

WICKLIFFE, OHIO

NEW YORK • DETROIT

PITTSBURGH • CHICAGO

MATERIALS HANDLING EQUIPMENT



JULIUS P. HEIL

left or were threatening to leave Pennsylvania a similar message.

After his election Mr. Heil, who is 63, celebrated the victory by traveling east in an attempt to obtain another big order for truck body equipment made by his company.

Meanwhile Wisconsin voters recalled that Mr. Heil's campaign speeches promised a "fair deal" for both employees and employers.

Born in Germany

Wisconsin's new governor was born in Germany and was brought to America in infancy by his parents, who were farmers. Leaving the country school at 12, he learned the machinists trade in the Milwaukee plant of the present International

Harvester Co., as an apprentice drill press operator. Afterward he went into the plant of the present Falk Co., where he developed a welding technique which sent him into many states and South America to supervise welding of electric street railway tracks.

In 1900, when 24, Mr. Heil established the Heil Rail Welding Joint Co., out of which he has developed the present Heil Co., a major Milwaukee metal-working concern. His victory in the November election is considered an astonishing feat because it means the smashing, temporarily at least, of the LaFollette dynasty which has dominated Wisconsin politics for nearly half a century.

Son is Assistant

Mr. Heil's only child, Joseph F. Heil, is vice-president of the Heil Co. and his father's chief assistant in the firm. The new governor will be inaugurated at Madison, Wis., state capital, on Jan. 2. Meanwhile he assumes important matters of state, principally preparation of state budgets for action by the biennial session of the Wisconsin Legislature, convening at practically the same time as the inauguration.

Mr. Heil is prominent in fraternal activities, and besides being a past potentate of Tripoli Temple, Mystic Shriners, is treasurer of its present board of trustees, and chairman of the trustees of Milwaukee Lodge No. 46, of the Elks. As such he handled a financial reorganization of the affairs of the Elks in connection with its \$1,500,000 clubhouse project. He is also a director of the Milwaukee Athletic Club and numerous other fraternal and civic organizations, including the Rotarians of Milwaukee.

Republic Will Make Wire Mesh at Gadsden

FABRICATING facilities at the Gadsden plant of Republic Steel Corp. are to be expanded as the result of the installation of two machines for manufacturing welded wire mesh and of equipment for bending building reinforcing. Capacity of the new plant will be approximately 2000 tons per month, and the new machinery installations will necessitate the construction of a building 72 ft. by 480 ft., and a crane runway yard 72 ft. by 360 ft.

Work on the expansion is to be started promptly, and production is expected to be under way by April 1. This new development for Gadsden

represents the largest single appropriation of nearly \$1,250,000 just approved by the corporation's directors for plant improvements and expansion through the country.

Truscon Steel Co., a subsidiary of Republic, will operate the new plant. Kenneth D. Mann, executive vice-president of Truscon, said, "the decision to undertake the manufacture of wire mesh at Gadsden was prompted by the rapidly growing use of this type of concrete reinforcement by highway departments in the Southern states."

Power Exposition Will Open on Dec. 5

NEXT month the 13th National Exposition of Power and Mechanical Engineering will be held in New York for the purpose of presenting to industrial engineers and executives recent developments in the field of power and mechanical engineering. Over 270 exhibitors already have reserved space on the three floors of Grand Central Palace. The exposition will be held Dec. 5 to 10.



**Soundest,
Safest
Flooring**

The long-wearing
toughness of
Rolled Steel

Good flooring pays dividends in safety, in plant appearance, in the faster movements of men and materials and in year-after-year freedom from repair costs.

When you repair, modernize or plan plant extensions ask your distributor for Inland 4-Way Floor Plate. Remember, that it's rolled steel which cannot crack, crumble or chip—and provides safe traction in all directions.

INLAND 4-WAY FLOOR PLATE

Made by The Inland Steel Co., 38 So. Dearborn St., Chicago

SHEETS STRIP TIN PLATE BARS PLATES FLOOR PLATES
STRUCTURALS PILING RAILS TRACK ACCESSORIES REINFORCING BARS

... PERSONALS ...

GEORGE WHEELER WOLF has been appointed president of the United States Steel Products Co., effective Jan. 1, 1939, export subsidiary of the United States Steel Corp. Mr. Wolf succeeds GEORGE C. SCOTT, who is retiring from active service but will remain with the products company in an advisory capacity.

Mr. Wolf, at present operations

manager of the General Motors overseas operations, is well known in export circles of the automotive industry. With General Motors for 13 years, 10 of which were spent abroad, he was successively managing director of General Motors, Argentina; General Motors, Poland; General Motors G.m.b.H. Germany; and General Motors Peninsular at Barcelona, Spain. In January, 1936, he returned to the United States as vice-president of the General Motors export division in



G. W. WOLF

• Material cost will vary as much as 10% when you buy strip steel on a basis of commercial gauge tolerances. For example, steel .010" thick is allowed .001" plus or minus, which becomes an addition or reduction of 10% in length . . . that percentage more or fewer finished parts. Many buyers have been paying extra to get closer accuracy to gauge.

Today, that is not necessary. Cold Rolled Precision Strip Steel produced regularly on our 4-high single stand reversing mills is held to exceptionally close limits over the complete width and length of the strip. The trade refers to this as "C.M.P. Accuracy."

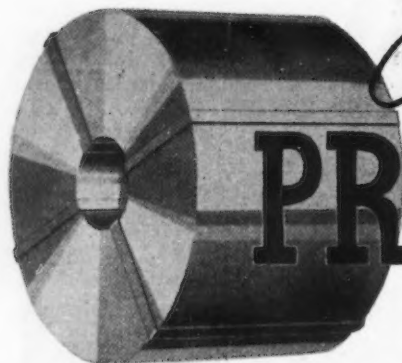
Specify "C.M.P. Accuracy"

Specify any analysis and temper you require—in carbon or stainless steels—specify gauges as light as .001" if you can use them—specify the largest coils you can handle—but leave the matter of gauge tolerance to us by simply specifying "C.M.P. Accuracy." You will find an appreciable increase in output per hundred pounds of metal. These advantages are available to you at no extra cost.

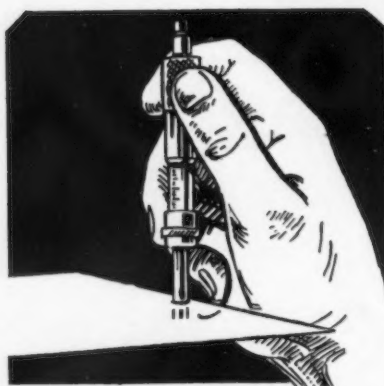
Write for Samples and Details

We will gladly send you samples of Precision Strip Steel as light as .001", explain their advantages fully and describe how our continuous annealing method guarantees uniformity.

THE COLD METAL PROCESS CO.
YOUNGSTOWN, OHIO



Cold Rolled
PRECISION
STRIP STEEL



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In Cold Rolled Strip Steel

charge of production and engineering, with headquarters in Detroit.

Mr. Wolf was born in Pittsburgh in 1892 and was appointed to the Naval Academy in 1909. He was graduated in 1913 and served in the Navy until his resignation in 1926 as a lieutenant-commander, at which time he was gunnery officer of the scout cruiser *Concord*. In 1917-1918 he commanded a submarine in the European war zone. At the close of the war Commander Wolf was awarded the Navy Cross



R. C. ALLEN

for distinguished and meritorious service overseas. In 1919 he was selected by the Navy Department for post graduate instruction in ordnance and gunnery and while in that capacity specialized in metallurgy at Lehigh University.

Commander Wolf holds a commission in the Volunteer Naval Reserve. He is a member of the Army and Navy Club in Washington, the United States Naval Institute and the Society of Automotive Engineers.



ROLLAND C. ALLEN, executive vice-president of Oglebay, Norton & Co., Cleveland, has become a member of the board of trustees of Battelle Memorial Institute, Columbus, Ohio, according to announcement by EARLE C.



R. J. LECKRONE

DERBY, newly-elected president of the board. Mr. Allen's appointment, filling the vacancy created by the death of Joseph H. Frantz, late president of the board, brings to the research institution the services of an executive with wide experience in scientific, governmental, and industrial organizations.

Mr. Allen is known not only as executive of a leading iron mining and shipping company, but as a geologist, mineral economist, president of the Lake Superior Iron Ore Association, and former director of the Michigan Geological Survey. During the World War, Mr. Allen was a member of the War Profits and Excess Profits Tax

Board. He organized and was first chief of the Division of Natural Resources in the U. S. Treasury. He has been identified with Oglebay, Norton & Co. since 1923.



ROY J. LECKRONE has been appointed chief designing engineer, Lewis Foundry & Machine division of the Blaw-Knox Co., Pittsburgh. Mr. Leckrone has been connected with the various fields of the steel and allied industries since he left the University of Penn-

sylvania. He has spent three years in Russia designing and building American type of rolling mill equipment. His headquarters will be at the company's plant at Groveton, Pa.



D. G. HENDERSON has been named president of Consolidated Steel Corp., succeeding REESE TAYLOR, who has resigned to become president of Union Oil Co. Mr. Henderson was formerly vice-president in charge of production and treasurer, and will retain the lat-

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• The H. & K. line of perforations for industrial purposes includes a great variety of sizes and various shapes designed for efficiency and adaptability.

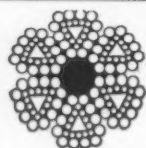
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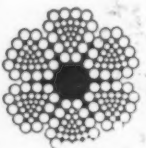
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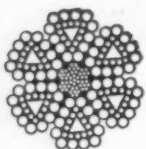
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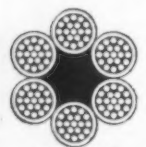
Style B
Flattened Strand



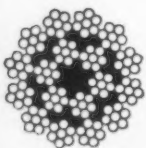
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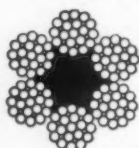
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Filler Wire



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Extra Flexible



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Extra Flexible

ter post. ALDEN G. ROACH, former vice-president in charge of sales, becomes executive vice-president. Consolidated Steel Corp. was formed in 1928 by the merger of the Baker, Llewellyn, and Union Iron Works.

♦ ♦ ♦

L. A. SCHMIDT, chief engineer of National Tool Co., Cleveland, has been elected a vice-president to fill the vacancy resulting from the death last year of ERNEST LEES. DAVID FORD, New York, president, Central Foundry Co., LOUIS JUBENVILLE, Detroit, and ALBERT A. HOUCK, Rochester, were elected directors of National Tool Co.

♦ ♦ ♦

JOHN E. URQUHART has been appointed general superintendent of all operations of the Woodward Iron Co., Woodward, Ala. Heretofore he has been general superintendent of all operations except coal and ore mining. The latter have now been placed under his supervision.

♦ ♦ ♦

J. M. FRANKLIN has been appointed general manager of the Holt, Ala., operations of the Central Foundry Co. Previously he was assistant superintendent.

♦ ♦ ♦

E. T. LORIG has been appointed chief engineer of the new Irvin works, Clairton, Pa., of the Carnegie-Illinois Steel Corp., Pittsburgh. R. J. MACKENZIE has been made assistant chief engineer; A. L. BILLETER, division superintendent, flat products finishing; A. C. BLEDSOE, superintendent of cold reduction; JOHN S. ALTER, assistant chief metallurgist; F. L. SCHWEARINGEN, construction engineer; A. J. BERDIS, appropriation control engineer; KLAUS EGGE, chief design engineer; SAMUEL B. WEBSTER, project engineer; J. W. BATES, electrical engineer, and W. H. DAILEY, power and fuel engineer.

♦ ♦ ♦

DUANE E. STEINLE, for the past year connected with New Britain-Gridley Machine division of the New Britain Machine Co., New Britain, Conn., has been transferred to the sales engineering staff of the company's Detroit office.

♦ ♦ ♦

W. G. HURLBERT, JR., has been elected president of the Bostwick Steel Lath Co., Niles, Ohio, succeeding his father, WILLIAM G. HURLBERT, who has been made chairman of the board. Mr. Hurlbert, Jr., was graduated from Colgate University in 1912 and has been associated with the Bostwick company since that time successively

as secretary, treasurer and general manager.



L. L. HURD, who has been identified with the Buffalo Bolt Co., North Tonawanda, N. Y., since 1934, has been appointed assistant sales manager. He was graduated from Phillips Exeter Academy in 1919 and from the Sheffield Scientific School of Yale University in 1923.



C. E. HERRINGTON has been appointed publicity and advertising manager of the Meehanite Research Institute of America, Pittsburgh. O. SMALLEY, president of the Meehanite Metal Corp., Pittsburgh, has been re-elected president of the institute; H. B. HANLEY, foundry manager of the American Laundry Machinery Co., Rochester, N. Y., has been made vice-president and F. M. ROBBINS, president of the Ross-Meehan Foundries, Chattanooga, Tenn., secretary-treasurer.



CHARLES T. RAY, president, B. F. Avery & Sons Co., Louisville, Ky., was elected president of the Farm Equipment Institute at its 45th annual convention at French Lick Springs, Ind. W. L. CLARK, vice-president, J. I. Case Co., Racine, Wis., was elected chairman of the executive committee, the members of which are as follows: W. D. JAMES, president, James Mfg. Co., Fort Atkinson, Wis.; C. B. SCHMIDT, general manager, De Laval Separator Co., Chicago; H. S. LORD, vice-president, French & Hecht, Inc., Davenport, Iowa; W. A. ROBERTS, general sales manager, Allis-Chalmers Mfg. Co., Milwaukee; GEORGE S. HOOPER, secretary, Southern Plow Manufacturers' Association, and H. C. ANGSTER, secretary-director National Association of Domestic and Farm Equipment and Allied Products Manufacturers, Chicago. F. H. CLAUSEN, president, Van Brunt Mfg. Co., Horicon, Wis., was elected first vice-president.



GEORGE REINDEL, JR., has been made Detroit district manager, with offices in the Stormfeltz-Loveley Building, of the Emerson Electric Mfg. Co., St. Louis.



J. R. TOWNSEND, materials standards engineer, Bell Telephone Laboratories, Inc., New York, has been elected a member of the executive committee of the American Society for Testing Materials.



CATHERINE A. MURPHY, manager of the steel department of the Brown-



PICK IT UP

—with this sturdy R & M Electric Hoist and jib crane. Costs little, does much. R & M builds 2000 types of hoists and cranes . . . and special types to fit special needs. Take advantage of this *personalized service*. For information on latest improvements in hoists and cranes, electric or hand-operated, write for Bulletin 6161.

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Your Inquiry Will Receive Prompt Attention

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WARREN

OHIO

"If It's Round We Can Make It"

Wales Co., Boston, received a wrist watch on Nov. 2 from Quincy W. Wales, president of the company, on the completion of 30 years of continuous service with the company.

♦ ♦ ♦

W. K. YOUNG has joined the Eclipse Counterbore Co., Detroit, as manager of the company's newly-created boring bar division.

♦ ♦ ♦

A. R. SOLTIS, who has been handling sales of U. S. Royalite and Vul-

canite grinding wheels in the Detroit district for United States Rubber Products, Inc., will include in his activities the Indianapolis and St. Louis districts. He will continue to make his headquarters at Detroit.

♦ ♦ ♦

CHESTER H. GIBBONS, formerly stationed at the plant of Baldwin-Southwark Corp., Eddystone, Pa., has been transferred to the Ohio district in charge of the sales of products of the Southwark division. He succeeds A. Q.

DAVIS, recently appointed shop superintendent of the Baldwin-Southwark Corp.

♦ ♦ ♦

HENRY R. HANSON has joined the sales organization of William K. Stamets, machine tool dealer, Pittsburgh, and will work out of the Cleveland office. Mr. Hanson was formerly sales representative for Latrobe Tool Co. in Ohio and Pennsylvania.

♦ ♦ ♦

H. J. ROWE, of the foundry division of the Aluminum Co. of America, Cleveland, will discuss "Aluminum Alloy Castings, Their Manufacture and Use" before the Philadelphia chapter of the American Foundrymen's Association, on Nov. 11 at the Engineers Club, Philadelphia.

♦ ♦ ♦

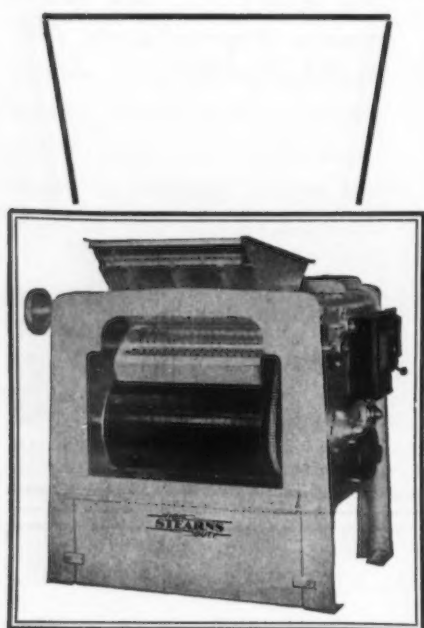
CHARLES O. McINTOSH, West Hartford, Conn., has been reelected president of the Southern New England Chapter of the Institute of Scrap Iron and Steel. SIDNEY ALBERT, of Albert Brothers, Waterbury, Conn., has been reelected vice-president and S. SAMUEL KASDEN, of H. Kasden & Sons, Inc., New Haven, Conn., secretary-treasurer.

R. J. Watkins Appointed To Wage-Hours Board

PITTSBURGH. — Dr. Ralph J. Watkins, director, Bureau of Business Research, University of Pittsburgh, has been appointed director of the new Wages and Hours Board, effective Jan. 1, 1939. Dr. Watkins, who has been head of the Bureau of Business Research since 1930, has been granted a leave of absence of a year and a half by the university. During the past eight years he has been closely associated with business men and business conditions in the Pittsburgh metropolitan area, and the work of the bureau has been commended for its accuracy and impartiality.

2410 Tons of Track Shipped in October

SHIPMENTS of T-rail track of 60 lb. per yard and heavier totaled 2410 tons in October, as compared with 2346 tons in the preceding month and 6137 tons in October, 1937, according to the American Iron and Steel Institute. The cumulative total of shipments for the first 10 months of the present year is 29,814 tons. In a corresponding period in 1937 shipments amounted to 84,028 tons.



YOUR SCRAP METAL IS VALUABLE

Reclaim brass, bronze
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and turnings with

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STEARNS TYPE "L"

MAGNETIC SEPARATOR

There is a fortune in scrap metal that will make the Stearns Type "L" Magnetic Separator a definitely profitable investment. Investigate the Stearns better engineered method of magnetic separation.

Stearns engineers have had close to forty years practical pioneering experience. Get their recommendation for your problem.

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SEPARATORS DRUMS ROLLS Formerly Magnetic Mfg. Co. HIGH DUTY **CLUTCHES** BRAKES MAGNETS
LARGEST EXCLUSIVE BUILDERS OF MAGNETIC EQUIPMENT

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General Motors Announces Guaranteed Annual Wage in '39

ALFRED P. SLOAN, JR., chairman of General Motors Corp., has announced, effective for 1939, two benefit plans available for eligible hourly wage employees having a service record of two years or more.

"The purpose is to provide greater income security for a broad coverage of our employees," Mr. Sloan said. "The plans will be known as the General Motors Income Security Plan, and the General Motors Lay-Off Benefit Plan.

"The Income Security Plan is applicable to all hourly wage employees having five or more years' service and who are in the employ of the corporation any time during December, 1938.

"Every eligible employee is assured that in each week during the year in which the plan is in operation his income will not be less than 60 per cent of his standard weekly earnings. The standard week is 40 hr. with time and a half for overtime. The plan is conditioned upon the continuation of that standard. 'Standard weekly earnings' are defined as the pay for 40 hr. at the latest average hourly earned rate. Thus, every employee eligible under the plan is enabled to make his personal arrangements for a full year ahead with assurances that in no week will his income be less than 60 per cent of standard weekly earnings.

Income Security Plan

"The weekly guaranteed income will consist of (a) pay for the amount of work performed for the corporation; (b) pay for any other regular employment; (c) unemployment compensation; (d) an advance to be made by the corporation to insure a minimum weekly income of at least 60 per cent of standard. The advance by the corporation is made on the request of the employee and is payable only in terms of opportunity to work. That condition cannot be too greatly emphasized. An advance is not a liability in the ordinary sense, is payable only through work and bears no interest. When the weekly earnings exceed 60 per cent of standard, the employee will repay advances at the rate of one-half the amount by which such earnings exceed 60 per cent of standard. Should any employee die, his unpaid advances will be canceled.

"The Income Security Plan, when

declared operative for any particular year, is independent of changing business conditions.

"The second plan, to be known as the General Motors Lay-Off Benefit Plan, will make available benefits for employees not within the Income Se-

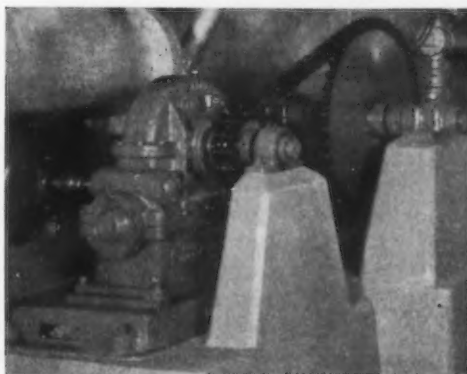
curity Plan who have a service record of two years or more and who worked any time after December 1 of the previous year," said Mr. Sloan. "Employees eligible will be entitled to receive weekly forty per cent of their standard earnings under the same general conditions as apply to the Income Security Plan, except that the total advance made by the Corporation is here limited to an amount equivalent to seventy-two hours' earnings at the employee's latest average hourly earned rate. Amounts so advanced will be

Way back
in the '80's
... wasted
H. P.
meant this
to business
management
... but
TODAY ..



if you are wasting horsepower, through inefficient Power Transmission Devices, it means YOU NEED PHILADELPHIA WORM GEAR SPEED REDUCERS

By concentrating on correct design and accurate manufacture of the worm and worm gear sets that go into Philadelphia Worm Gear Reducers, we have developed units having the highest possible efficiencies.



The modern drive above shows a Philadelphia double reduction Worm Unit operating water treating equipment. Note the heavy overhung load.

On actual production they transmit power, with efficiencies that average up to 95%. To procure this, and still maintain a heavy load carrying capacity, the gear sets have been designed to operate with maximum rolling action and minimum sliding action.

Every detail of manufacture has been carefully watched, beginning with the materials which are generally chill cast nickel bronze for the gear and a high alloy steel worm carefully carburized to give proper depth and hardness of case.

The ultimate in precision and accuracy is accomplished by the final machine grinding of the worm threads and accurate generation of the gear teeth. This positively insures correct tooth form and a smooth bearing surface.

For full information about these units, send for our catalog No. 24.

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WORM GEAR

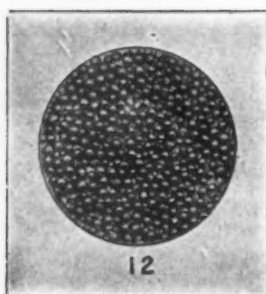
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Philadelphia Gear Works

Industrial Gears and Speed Reducers

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GRIT

Unusual quality is creating demands for both our Heat-Treated Chilled Shot, and Heat-Treated Steel Grit.

One contract calls for 300 tons of our steel grit; another contract calls for 250 tons of our Special Heat-Treated Shot. Many car-load lots of both shot and grit.

There must be a reason for this, and the reason is plain: namely, unusual quality; prompt deliveries; uniform quality the year round; satisfactory prices.

Send samples of the sizes you are now using. We will match any size, and name prices that will interest you.

We manufacture a shot and grit that you will eventually use.

HARRISON ABRASIVE

Corporation

MANCHESTER, NEW HAMPSHIRE

We Never Compromise With Quality

repaid by the employee, but only in work performed, under the same conditions as apply to the Income Security Plan.

Work Not Guaranteed

"Particular attention is called to the fact that the corporation is not guaranteeing work for which there is no need. However, using the resources of the corporation as an income stabilizing factor, giving the largest group of employees possible a definite assurance of a substantial minimum weekly income for a definite period is, according to my beliefs, sound and highly desirable. I am gratified that our experiments indicate that it is possible for us to make this further progress toward the objective of providing greater economic security for an important part of our organization.

"It is indicated by our studies that under these plans the advances to the employees benefiting in subnormal periods of activity which occur in the automotive industry year will involve a substantial outlay. While the corporation may sustain a considerable loss, I believe that the greater security provided under the plans, and the better relations that such cooperation will promote between the corporation and the employees benefited, will justify the costs involved.

"Consideration is being given to a suitable plan applicable to approximately 37,000 salaried employees, to be announced shortly."

... OBITUARY ...

WILLIAM D. LEWIS, 78, retired director and purchasing agent of Cleveland Hardware Co., Cleveland, died at Lake Worth, Fla., Nov. 3, at the age of 78. He had been with the company 49 years.

♦ ♦ ♦

CARL ERNEST PIOCH, widely known automotive engineer and a brother of William F. Pioch, of the Ford Motor Co., died Nov. 8 in Detroit. He was born in Bay City, Mich., March 25, 1893. From 1910 to 1915 he was employed as a draftsman at the Bantam Motor Car Co., Ford Motor Co. and the Maxwell Motor Co. Then he went with Dodge Brothers, remaining until 1934. When he left that Chrysler division he was rated as master mechanic. He became a sales engineer for Frederick Colman & Sons, tool works, and was also with F. Joseph Lamb Co. In 1937 he participated in founding Products Engineering Service, a consulting firm.

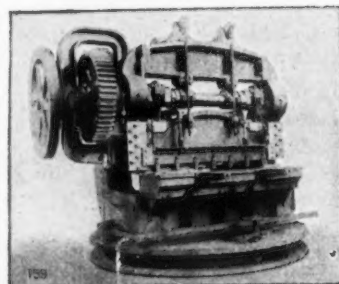
♦ ♦ ♦

FRANK D. CARRICO, an automotive designer for 30 years, was buried Nov. 9 in Detroit. He was 65 years old. Born in Louisville, Ky., he had lived in Detroit for 28 years and was a special machine designer for the National Broach Co. for the last four years. Mr. Carrico was chief engineer for Willys-Overland Co. when it was organized in Indianapolis and he designed the early Overland car. Later

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BENDING AND STRAIGHTENING MACHINES • MULTIPLE DRILLS

FABRICATING MACHINERY

PUNCHES • SHEARS • SPACING TABLES

he designed and developed the Carrico air-cooled engine and aided in designing the Franklin air-cooled engine. In Detroit he was associated with Ford Motor Co., Dodge Brothers Corp., Timken Detroit Axle Co. and the experimental laboratory of General Motors Corp. He had no engineering degree, his formal education having been limited to grade school. His father trained him as a carpenter, then he took pattern making and trained himself further through a trade school course.



W. H. MERRETT, assistant professor of metallurgy at London University until his retirement in 1937, died recently in London at the age of 66. He was an outstanding figure in steel research, having constructed the first apparatus to record the differential cooling of steel in conjunction with the late M. Osmond and Professor le Chatelier.



JOHN F. OHMER, president and founder of the Ohio Fare Register Co., Dayton, Ohio, died Nov. 4 in Dayton, at the age of 82. His invention in 1898 of a fare registering and

indicating device led to the organization of the company, which became world famous, and which expanded into other fields, including the manufacture of gun mounts and sights.

Westinghouse to Build Largest Generators

MORE powerful than the largest generators in operation in the United States, three main generators for Grand Coulee Dam now being built by the Westinghouse Electric & Mfg. Co. will each have a rating of 108,000 kva. or enough power to supply illumination to New York City and Chicago combined.

A \$2,627,970 contract to build these generators as well as a \$193,480 contract for two smaller station service generators was awarded to Westinghouse. All of these generators are to be installed in the West power station which when completed will contain nine main and three station service generators. The East power station will contain nine main generators when completed.

D. A. Wallace Discusses Superfinishing

IF the truly crystalline structure of a metal is exposed by removing the amorphous metal ordinarily created on the surface by the heat generated during the various machining processes used to finish it, no wear can take place if the surface is lubricated.

That is the gist of one of the main points brought out by David A. Wallace, president of the Chrysler sales division of Chrysler Corp., in explaining the fundamental theory of Superfinishing before a group of technical editors at a luncheon at the Cloud Club, Chrysler Building, New York, on Nov. 11. Like peeling the skin off an orange, the Superfinishing process removes this amorphous, malleable surface in the matter of a few seconds, leaving a surface free of microscopic projections that will wear practically indefinitely.

Calling attention to the heat produced in the ordinary grinding process, where particles torn loose are in an incandescent state, Mr. Wallace also contended that the depth of



MR. SMITH TAKES NO CHANCES

THERE'S no question about it, Mr. Smith is a very cautious man. He doesn't take chances on *anything*. That's one reason why he's so successful.

For example, take the matter of the metal cleaners that Mr. Smith uses in his plant. Here's the way his mind works—"Everything's going all right, *but* . . . I'm not satisfied. We may run into some trouble. Perhaps we can save fifteen cents a hundred with a Wyandotte Cleaner." So Mr. Smith called in a Wyandotte Service Representative and asked for his recommendations. Then he tested the solutions under production conditions.

Mr. Smith had the same experience that you can enjoy with Wyandotte's specialized line of metal cleaners. He's saving money on cleaning operations, and he's almost forgotten what a reject is. Why don't you, too, ask a Wyandotte Service Representative to call?



scratches produced by grinding were the same, regardless of the grit of the abrasive used. The Superfinishing technique employs an abrasive stone of around 400 grit, but the pressure applied is a matter of only a few ounces and the depth of cut is invariably about 0.0001 in., no matter how the surface was previously finished. This reduction in size takes place almost instantly and hours of further Superfinishing produces no further measurable effect. With the light pressure employed no heat of work is produced and hence no further amorphous structure is created on the surface. The finest mirror surface can be produced on graphitic cast iron, Mr. Wallace said, because the ferrite and cementite crystals are actually split in the process.

By utilizing a minimum of three separate motions of the stones, optically flat surfaces can be produced by Superfinishing, and when two such surfaces are placed face to face, molecular attraction is so great as to make it difficult to pull or slide them apart. With a Superfinished plug and hole of proper relative dimension, a molecular weld can be obtained that is practically inseparable, Mr. Wallace illustrated. Incidentally, in developing the complex motions required for Superfinishing, square and eccentric gears, heretofore a museum novelty, have been applied with practical results.

Mr. Wallace revealed that the Chrysler Corp. had spent about \$300,000 on the development of this new technique, but that millions of dollars

would have to be spent for the processing of all wearing parts of an automobile. A machine is under construction now that will rough bore, ream and Superfinish cylinder bores to a tolerance of 0.0001 in. on diameter, out-of-round and taper, roughly one-tenth present commercial tolerances for like work.

Birdsboro Steel Buys Scott Foundry Division

BIRDSBORO STEEL FOUNDRY & MACHINE CO., Birdsboro, Pa., has purchased additional plant facilities in Reading. The property acquired is a part of the plant of the Reading Iron Co. on North Eighth Street, known as the Scott Foundry Department. The property comprises an erecting shop of 203 ft. x 150 ft., which is already in use by the Birdsboro company as a machine and erecting shop; an L-shaped foundry 303 ft. x 230 ft.; a boiler house 54 ft. x 38 ft.; a machine shop 230 ft. x 102 ft., which will be used for the manufacture of machine parts, and an office building 40 ft. sq.

These additional plant facilities will be used by Birdsboro in the manufacture of a new line of sheet grinding machinery and abrasion products and also for the further development of other Birdsboro lines.

TRADE NOTES

The Superior Wrought Washer Co., manufacturer of washers, riveting burrs, small stampings and awning hardware, has moved its headquarters to 1951 West 90th Street, Cleveland.

Pyramid Metals Co., 455 North Oakley Boulevard, Chicago, manufacturer of metal moldings, has moved its factory and office to 1335 North Wells Street, Chicago, where production space has been increased 300 per cent. Officers are Ira L. Reed, president, and Christopher Tonney, sales manager.

Taft-Peirce Mfg. Co., Woonsocket, R. I., has appointed John E. Livingstone Co. as exclusive sales representative in Michigan for products of the company's small tool and gage division. Complete office and warehouse facilities are at 7310 Woodward Avenue, Detroit, where J. B. Rousseau, Taft-Peirce district sales manager, will make his headquarters.

General Alloys Co., 367-405 West First Street, Boston, has appointed Walter Gerlinger, Inc., 610 West Michigan Street, Milwaukee, as representative for the entire state of Wisconsin in handling the company's line of alloy castings.

Chain Belt Co. announces addition of a complete new line of screw conveyors and steel buckets at its plant 4425 West Cortland Street, Milwaukee.



Speed, action—and a high grade job—are offered by Hi-Tensile "G". The smoothness of the bead is surprising, its ductility unusually high.

Hi-Tensile "G" has easy handling qualities—as well as speed and quietness. Perfectly suited to in-

dustrial production, to maintenance work, to construction work—and to the odds and ends of jobs that reach the average welding shop.

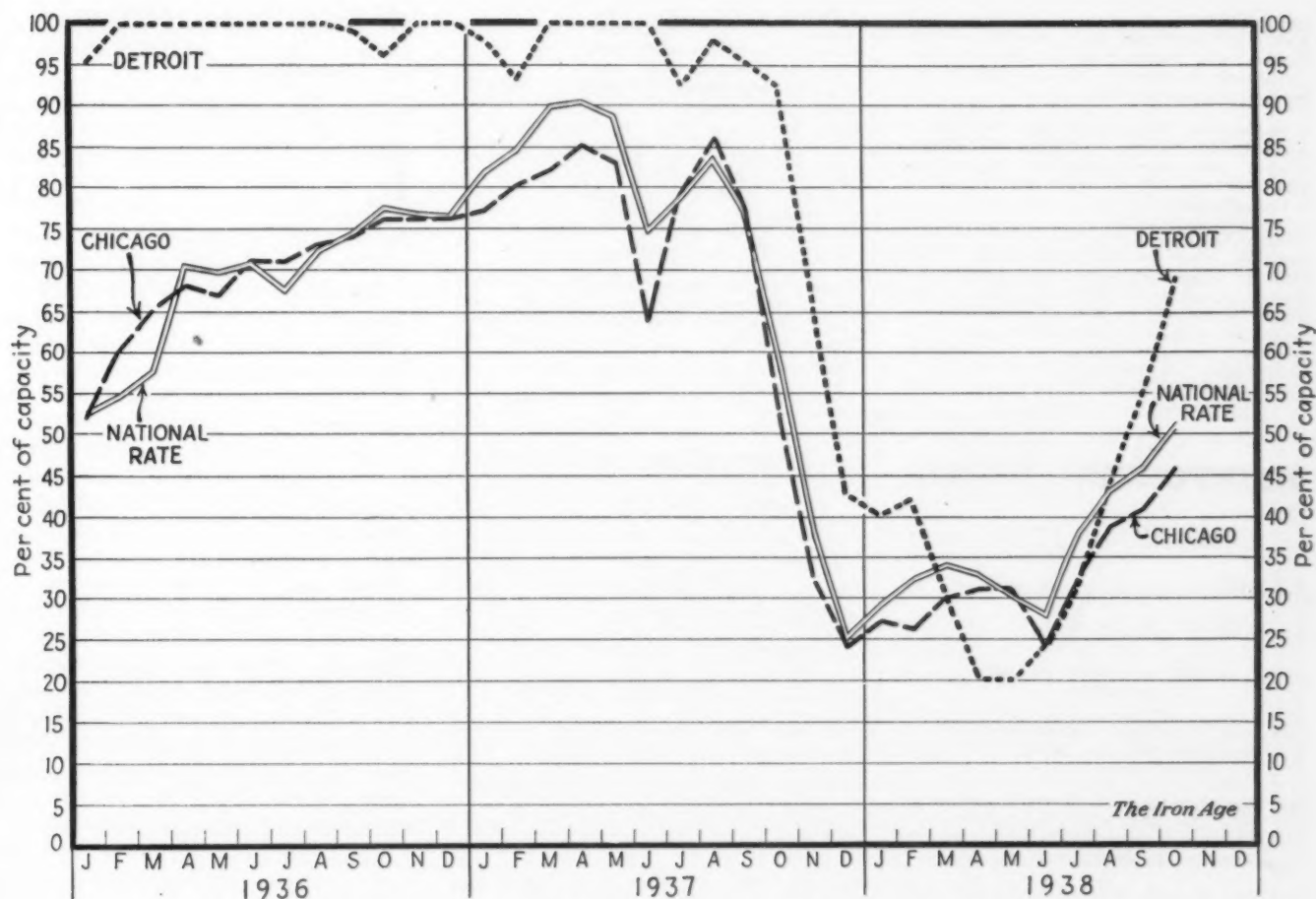
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PAGE *Welding* **WIRE**



A Comparison of Ingot Output in the Chicago and Detroit Districts

WITH the exception of the spring of this year, the ingot producing facilities of the Detroit district have been for the past two and one-half years operating at a rate consistently higher than both the Chicago and the weighted national rate, as the

chart published herewith illustrates. The Chicago area, second largest ingot producing area in the United States, contains 19 per cent of the country's ingot capacity, while Detroit, ranking eighth in ingot capacity, accounts for 3.6 per cent of the nation's

producing facilities. In October of this year, the Chicago district operated at an average of 46 per cent of capacity and produced 6,250,020 tons of ingots. In the same month, the Detroit district, operating at an average of 70 per cent, turned out 1,804,600 tons.

. CAST IRON PIPE .

York Village, Me., has awarded 30,000 ft. of 6 to 16-in., mostly 8 to 10-in., pipe to R. D. Wood & Co.

Treasury Department has awarded 1000 ft. of 16-in. pipe for an Everett, Mass., project to Warren Foundry & Pipe Corp.

Craig, Mo., closes bids Nov. 25 for pipe for water system and other waterworks installation, including elevated steel tank and tower, and iron-removal equipment. Cost about \$41,700. Financing has been arranged through Federal aid. J. W. Shikles & Co., New York Life Building, Kansas City, Mo., are consulting engineers.

Spartanburg, S. C., asks bids until Nov. 28 for 39,000 ft. of 24-in. and 16,000 ft. of 20-in. pipe for main water lines, with alternate bids on cast iron and steel. Fund of

\$389,566 has been arranged for this and other waterworks installation. W. W. Griffin, chairman, Board of Public Works Commissioners, is in charge.

Electra, Tex., closes bids Nov. 22 for pipe line extensions and replacements in water system, including improvements in pumping station and other waterworks installation. Appropriation of \$145,000 has been made for work. Joseph E. Ward, Harvey-Snyder Building, Wichita Falls, Tex., is consulting engineer.

Melrose, Wis., closes bids Nov. 28 for 2118 ft. of 8-in., 12,277 ft. of 6-in., and 840 ft. of 2-in. pipe for water system (Contract No. 3); 50,000 to 75,000-gal. steel reservoir (Contract No. 4); pumping machinery and electrical equipment (Contract No. 5), and water meters (Contract No. 6). Fund of \$47,273 is available. Frank J. Davy & Son, 502 Main Street, La Crosse, Wis., are consulting engineers.

Wellington, Mo., asks bids until Nov. 21 for pipe for water system and other waterworks installation, including elevated steel tank and tower, and iron-removal equipment. Cost about \$40,000. Shockley Engineering Co., Graphic Arts Building, Kansas City, Mo., is consulting engineer.

Mentor, Ohio, has awarded 625 tons for a water distribution system to J. B. Clow & Sons Co., Cleveland.

Akron, Ohio, will take bids Nov. 21 on a water distribution system requiring about 825 tons.

Chariton, Iowa, plans pipe lines for water system and other waterworks installation, including 250,000-gal. elevated steel tank and tower. Cost about \$50,000, of which \$22,500 will be a Federal grant. W. L. Perkins is engineer.

Haines City, Fla., plans 21,700 ft. of 6 and 10-in. cast iron pipe for main water

lines, and 4760 ft. of 3-in. galvanized steel pipe for distributing lines; also 200,000-gal. storage tank, pumping machinery and other waterworks installation. Fund of \$94,000 has been secured through Federal aid.

Jacksonville, Fla., plans pipe line extensions in water system in South Jacksonville district and other waterworks installation. Cost about \$452,000, of which \$320,000 will be a Federal grant.

Indio, Cal., plans pipe lines for water system and other waterworks installation, including elevated reservoir and pumping machinery. Cost about \$90,000, of which \$50,000 will be a bond issue, recently voted, and remainder secured through Federal aid. Koebig & Koebig, Rowan Building, Los Angeles, are consulting engineers.

Oceanside, Cal., plans about 25,000 ft. of various sized pipe for extensions and replacements in water system; also other waterworks installation. Cost about \$90,000, of which \$49,500 will be a bond issue, recently voted, and remainder secured through Federal aid.

San Gabriel, Cal., will open bids Nov. 22 on 7269 ft. of 12-in. pipe for a sewer system.

Burbank, Cal., has awarded 103 tons of 4 and 6-in., class 250, pipe to National Cast Iron Pipe Co., Los Angeles.

Laurel, Mont., water system improvements include 400 tons of pipe purchased from American Cast Iron Pipe Co. by Nilson Smith Construction Co., Great Falls, Mont., contractor.

REINFORCING STEEL

*... Awards of 4750 tons;
13,800 tons in new projects.*

NORTH ATLANTIC STATES AWARDS

2000 Tons, Massachusetts flood repair work, to Bethlehem Steel Co., Truscon Steel Co. and Concrete Steel Co.

500 Tons, Brooklyn, Rapid Transit Railroad, route 110, Section No. 9, to Bethlehem Steel Co., Bethlehem, Pa., through George H. Flinn Corp.

330 Tons, Medford, Mass., Metropolitan sewer, to Concrete Steel Co., Boston.

CENTRAL AND WESTERN STATES

540 Tons, Berkeley, Cal., Farm Credit Administration building, to Bethlehem Steel Co., San Francisco, through K. E. Parker Co., San Francisco, contractor.

266 Tons, Rantoul, Ill., Army Air Corps, buildings, to Joseph T. Ryerson & Son, Inc., Chicago; through A. C. Atherton, contractor.

205 Tons, Bells Station, Cal., highway bridges, to San Jose Steel Co., San Jose, Cal.; through Granfield, Farrar & Carlin, San Francisco, contractors.

165 Tons, Mare Island, Cal., Schedule 2197, building 509, to Gilmore Steel & Supply Co., San Francisco.

150 Tons, Leavenworth, Kan., penitentiary, to Sheffield Steel Corp., Kansas City, Mo.

130 Tons, Wichita, Kan., intermediate school, to Sheffield Steel Corp.; through George C. Christopher & Sons, contractors.

125 Tons, Jacksonville, Ill.; water supply improvement, to Laclede Steel Co., St. Louis; through Missouri Engineer, St. Louis, contractor.

120 Tons, Fresno, Cal., grandstand, to Kyle & Co., Fresno; through Trewitt-Shields & Fisher, Fresno, contractor.

120 Tons, Champaign, Ill., Grain elevator, to Calumet Steel Co.

100 Tons, Indianapolis, Central State Hospital, to Hugh J. Baker Co., Indianapolis, through W. P. Junclaus Co., contractor.

NEW REINFORCING BAR PROJECTS

NORTH ATLANTIC STATES

900 Tons, Washington, Thomas Circle underpass.

550 Tons, Monmouth County, N. J., bridge and highway project.

350 Tons, Lockport, N. Y.; school bids Nov. 28.

290 Tons, Wildwood, N. J., boardwalk.

225 Tons, Buffalo, mesh and bars; Kenmore High School; bids closed Nov. 15.

200 Tons, Portsmouth, N. H., Navy Yard storage warehouse.

130 Tons, Philadelphia, municipal court building.

100 Tons, Naples, N. Y., school; bids due Nov. 30.

CENTRAL AND WESTERN STATES

3240 Tons, Bonneville Dam, power house; bids by United States Engineer, Dec. 9.

3000 Tons, Chicago, first section of subway; bids Dec. 1.

1000 Tons, Balos Verdes Reservoir, for Metropolitan Water District, Los Angeles; bids Dec. 9.

750 Tons, Chicago, trade school; bids in.

710 Tons, Parker, Ariz., United States Indian Irrigation Service (Invitation 498); bids Nov. 23.

433 Tons, Huntington, W. Va., flood control.

344 Tons, Turlock, Cal., overcrossing; bids Nov. 30.

280 Tons, Marshfield, Wis., high school.

220 Tons, Racine, Wis., filtration plant.

200 Tons, Riverside, Cal., Pedley bridge; bids Nov. 28.

194 Tons, Bakersfield, Cal., overcrossing; bids Nov. 23.

155 Tons, State of Wisconsin, six bridges; bids Nov. 18.

140 Tons, Blaisdell, Ariz., Gila project (Invitation 24667-A); bids in.

125 Tons, San Francisco, buildings at Presidio; bids Nov. 23.

121 Tons, Yellowstone National Park, Wyo., highway bridge for Bureau of Public Roads, Denver; bids Dec. 6.

112 Tons, Blaisdell, Ariz., Gila project (Invitation 24664-A); bids in.

Healthy Improvement In European Steel Situation

LONDON (By mail).—News of the rise in American steel mill activity has been welcomed in the United Kingdom, as sharp rises or falls in U. S. production are almost invariably followed by similar movements in Britain. Indeed, already there is an all-round improvement in the British steel industry, which will be reflected in the October production figures shortly to be published.

These figures will probably show October output to have been around 800,000 tons, an improvement of 45,000 tons on September and of 141,000 tons on the August "low" of 659,000 tons. A satisfactory feature of the recent revival in Britain is the improvement in export business. For example, orders were booked during October for 20,000 tons of shipbuilding steel for Scandinavian, Latin American and other markets, and further substantial orders are now being negotiated.

The higher output rate is due to genuine consumption demand and, as a result, it has not resulted in any further accumulation of stocks. The consumption of scrap by steel mills has been increasing steadily—a definite sign of increasing production.

The revelations of inefficiency and delay in the carrying out of Air Raid Precautions work during the recent crisis are expected to lead to an immediate demand for steel arches and sheets for air raid shelters from public authorities and private enterprises all over the country. In anticipation of this demand the British Iron and Steel Federation has opened a demonstration trench constructed with these materials in Battersea Park, London. Its form of construction has received official approval. In this connection, Guest Keen Baldwins Iron & Steel Co. has succeeded in producing a new bituminized finish for preserving the sheets when underground.

Belgian Business Gains

Since the beginning of November reports from the chief Continental centers have also indicated an increase in activity. In Belgium the works have so much business on hand that delivery times are becoming extended and orders have been received from overseas markets which have long been dormant. During the first three weeks of October, Cosibel, the Belgian selling organization, had

booked orders totalling 111,000 tons, of which 67,500 tons were for export and 43,000 tons for the domestic market. The price position has become much more satisfactory, and concessions on the official Cartel rates are seldom heard of. The fact that competition from American "independents" has considerably diminished has further strengthened the markets, although, on the other hand, cheap offers from Sweden appear to be on the increase. It is understood that a Belgian mission is visiting Sweden with the object of settling various points in connection with the Cartel organization and the position of re-rollers.

The French domestic market has lately received considerably increased business, and the Government has placed orders for large tonnages of steel. The expansion has also spread to the export side, and most consumers are asking for prompt delivery. In view of the amount of the increased capital required as a result of the depreciation of the franc, however, a number of concerns will require larger credits in order to fulfill their obligations. French producers have applied to the Cartel for an increase in prices of iron and steel products, but so far this has not been granted, and most sales are now made on the basis of prices ruling at the time of delivery.

No Slackening in Germany

Activity of Germany shows no sign of slacking. In the domestic market the demand is so great that stocks are non-existent, and many large building projects will have to be held up until supplies are more plentiful. A number of bridges and roads are to be constructed in the Sudeten area ceded by Czechoslovakia and arrangements have been made for the importation of a large tonnage of structural steel from Belgium. The shortage of skilled labor in Germany has also proved a severe handicap of late to the continuance of new projects. The German mills have plenty of export orders on hand, but such is the extent of the domestic demand that the tonnage sent out is necessarily restricted.

Meetings of the Steel Cartel have been held in Paris recently to discuss the effect of the German annexation of Czechoslovakian steel works on the working of the international quota agreements, but up to the present no decisions of importance have been reached concerning this difficult problem.

Industry Speaks

"We have today a very unusual condition in this country where we have got an excess of materials, an excess of money and an excess of men. Now, all that can mean to a primitive mind like mine is that we haven't got any projects to work on. That is all. It means that we are technologically behind and not technologically ahead."—**CHARLES F. KETTERING**, General Motors Corp. vice-president.

General Motors Corp. vice-president.

"Anyone who is thinking and planning in terms of an offensive war should come to a realization that they are planning for something far more destructive. They are really planning for the destruction of a cultural civilization."—**THOMAS J. WATSON**, president, International Business Machines Corp.

Industry Listens

SENATOR TOM CONNALLY (Dem. Texas)—"The election is just a slight political recession."

GOVERNOR - ELECT ARTHUR JAMES (Rep., Pa.)—"Although it will be regulated, industry must be given a little more than a breathing spell."

It must be given an opportunity to be restored to its feet."

KARL T. COMPTON, president, Massachusetts Institute of Technology—"Man's achievement in every age has been made possible by, and limited by, the tools at his disposal."

NLRB Orders Inland to Sign SWOC Contract

WASHINGTON.—The National Labor Relations Board, in an order affirming a previous order issued last April but subsequently withdrawn, has directed the Inland Steel Co., Chicago, to bargain with the CIO's Steel Workers Organizing Committee and to embody the terms of any agreement reached between the parties in writing. The company also was ordered to disband the Steel Workers Independent Union, Inc., and to post compliance notices in its plants for a 30-day period. Inland attorneys are expected to appeal to the United States Supreme Court.

Bids Asked on 2000 Tons Of Plates for Battleships

WASHINGTON.—The Bureau of Supplies and Accounts, Navy Department, will open bids Nov. 29 for 1000 tons of medium steel plates each for the battleships *North Carolina* and *Washington*, building at the Brooklyn and Philadelphia Navy yards respectively.

TRADE NOTES

United States Steel Wire Spring Co. has moved its factory and offices to larger quarters at 7800 Finney Avenue, Cleveland.

Chicago-Latrobe Twist Drill Works, Chicago, has changed its address from 100 South Jefferson Street, to 411 West Ontario Street, Chicago.

James Graham Mfg. Co., Newark, Cal., is modernizing its porcelain enameling department and has placed contract with Ferro Enamel Corp., Cleveland, for a "Junior Type" gas-burning continuous porcelain enameling furnace.

Ferro Enamel Corp., Cleveland, has completed installation of a new clay-drying and processing plant. Clay, which is now offered to the porcelain enameling industry, is packed in smaller bags and processing reduces moisture-content to lowest stable percentage and also removes harmful impurities.

Erie Enameling Co., Erie, Pa., has placed contract with Ferro Enamel Corp., Cleveland, for new porcelain enameling furnace.

Roberts Brass Co., 229 East Lincoln Avenue, Milwaukee, manufacturer of brass castings and distributor of brass and bronze products, has changed its corporate title to Lincoln Co., following the sale of its entire interests to the American Brass Co., subsidiary of the Anaconda Copper Co.



JOHN JENKINS, secretary-treasurer of Oliver Iron & Steel Corp., who started work in 1886.



Left to right in group photo with date of employment—Charles Wills, 1887; Nicholas Kessler, 1887; Frank Horn, 1883; Ferdinand Melsch, 1882.

Five Times Fifty—Plus

SPEAKING of long term employment and steady jobs, it would be hard to beat this record at the Oliver Iron & Steel Corp., Pittsburgh. At work in the works of this company are five men, none of whom has had less than 50 years of continuous employment.

The company, which manufactures bolts, nuts, rivets, forgings and pole line material, was established in 1863 under the name of the Plant Excelsior Bolt & Nut Works. In 1880 it was reorganized as Oliver Brothers & Phillips. Seven years later it was in-

corporated as Oliver Iron & Steel Co. In 1922, after acquiring Morris & Bailey Steel Co., Wilson, Pa., it became Oliver Iron & Steel Corp., which is its present designation. H. F. Devens is chairman and Theodore F. Smith is president.

... PIPE LINES ...

Humble Pipe Line Co., Houston, Tex., affiliated with Humble Oil & Refining Co., same place, has approved plans for new 4-in. welded steel pipe line from Fitzsimmons oil field, Duval County, Tex., to Benevides, Tex., about 21 miles, for crude oil transmission. Connection will be made with company pumping station and main pipe line system at latter place. Work will be carried out by company forces. Cost over \$100,000.

District Quartermaster, CCC, Fort Hayes, Columbus, Ohio, asks bids until Nov. 22 for galvanized steel pipe and galvanized steel nipples (Circular 5502-30).

Laclede Gas Light Co., 1017 Olive Street, St. Louis, plans extensions and replacements in pipe lines in connection with substitution of natural gas throughout city for present distribution of mixture of natural and artificial gas.

Bureau of Reclamation, Denver, asks bids until Nov. 30 for steel pipe, fittings and valves for power units A-6 and A-7 at Boulder power plant, Boulder Canyon project (Specifications 1141-D); two 102-in. diameter steel ring seal gates and two sets of steel conduit units for installation in outlet works at Green Mountain Dam, Colorado-Big Thompson project, Colo. (Specifications 811); until

Nov. 29, two 110-ft. roller gates with load disks and auxiliary load rings either welded or riveted steel construction for Roza diversion dam, Roza division, Yakima project, Wash. (Specifications 810).

San Antonio Public Service Co., San Antonio, Tex., is arranging fund of about \$300,000 for extensions and replacements in pipe lines for gas distribution system in 1939, part of appropriation to be used for purchase of regulators, meters and other equipment.

Greybull, Wyo., plans steel pipe line for main water supply from upper Shell Creek, where new water source will be developed, to city limits, about 20 miles. Bond issue of \$165,000 has been approved and further financing to make up estimated cost, \$300,000, will be carried out through Federal aid.

Constructing Quartermaster, Fort Sill, Okla., asks bids until Nov. 21 for 850 ft. of 2-in. and 80 ft. of 2½-in. coated steel pipe (Circular 6143-36).

Bureau of Reclamation, Denver, has received low bid from National Electric Products Co., Pittsburgh, on 2,000,000 ft. of 1-in. outer diameter black steel pipe or tubing for delivery at Odair, Wash.

General Purchasing Officer, Panama Canal, Washington, has opened bids on 62,480 ft. of galvanized steel pipe (Schedule 3395).

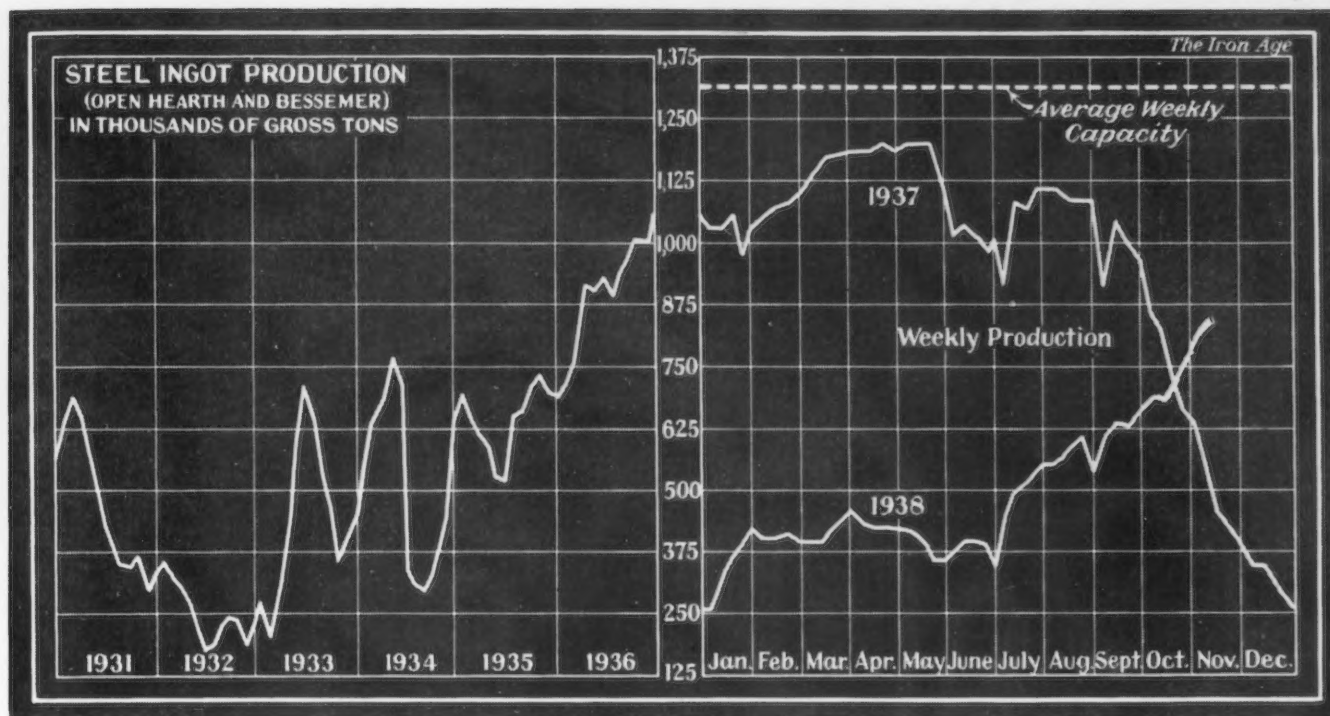
... CANADA ...

... Large British airplane contracts expected.

TORONTO, Nov. 15.—Demand for iron and steel is becoming more active in the Canadian markets and some fair-sized orders have been booked. The automotive industry has become one of the larger buyers.

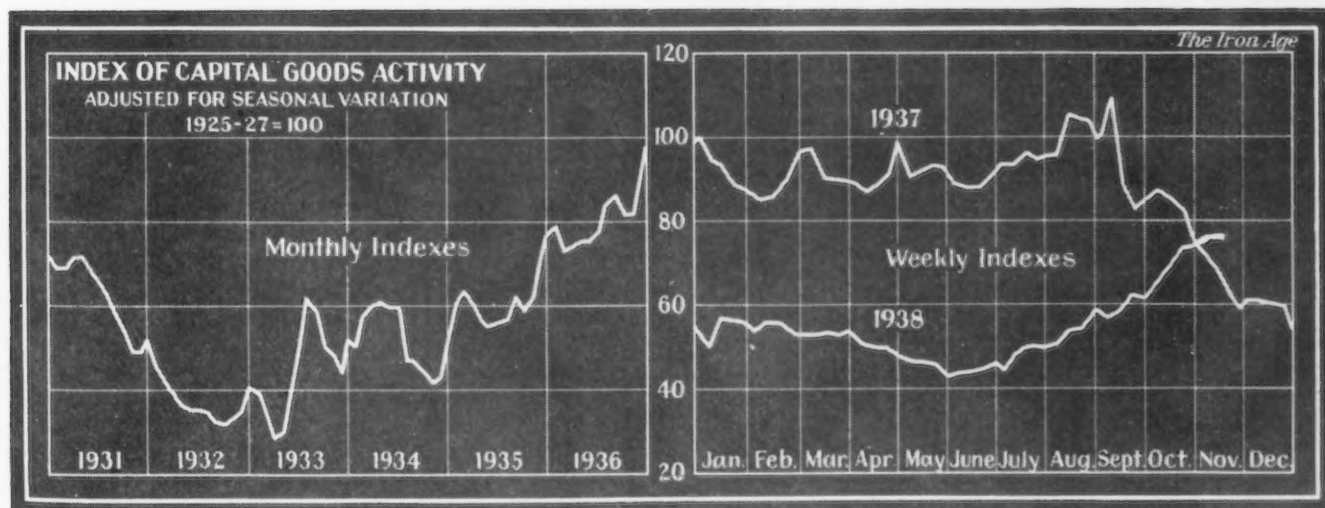
War materials contracts and airplane awards from the Canadian and British governments remain in the pending stage, but it is said that commitments will be made before the end of the year. It is understood that practically every Canadian company will share in British airplane contracts.

Pig iron demand shows further gains. Melters, however, continue to buy on a hand-to-mouth basis.



District Ingot Production, Per Cent of Capacity	CURRENT WEEK	PREVIOUS WEEK	Pitts- burgh	Chicago	Valleys	Phila- delphia	Cleve- land	Wheel- ing	Buffalo	Detroit	Southern	S. Ohio River	Western	St. Louis	East- ern	Aggre- gate
			50.0	60.5	66.0	37.0	74.0	93.0	49.0	85.5	56.0	64.0	40.0	58.5	75.0	62.5
			49.0	58.0	68.0	35.0	75.0	90.0	49.0	85.5	56.0	64.0	40.0	58.5	75.0	61.0

Capital Goods Index Rises to 75.8 in Holiday Week



DUE mainly to the substantial contraseasonal improvement in steel ingot production, THE IRON AGE index of capital goods activity rose 0.9 point to 75.8 in the week ended Nov. 12, despite a general slackening of activity due to the holidays. The present level of the combined index is the highest since the week of Oct. 30, 1937. The only other component of the index to advance in the week was the Pittsburgh series, which rose to the highest point reached in exactly one year. The automobile series was lower for the third consecutive week as assemblies continue to gain at a pace much slower than the normal seasonal trend.

	Week Ended Nov. 12	Week Ended Nov. 5	Comparable Week	
Steel ingot production ¹	89.5	80.8	1937	1929
Automobile production ²	89.1	90.8	58.0	104.6
Construction contracts ³	77.7	80.2	86.1	102.2
Forest products carloadings ⁴	56.6	56.6	54.5	115.5
Production and shipments, Pittsburgh District ⁵	65.9	64.9	71.0	108.0
Combined index	75.8	74.7	68.0	107.4

Sources: 1. THE IRON AGE; 2. Ward's Automotive Reports; 3. Engineering News-Record; 4. Association of American Railroads; 5. University of Pittsburgh.

... SUMMARY OF THE WEEK ...

... Ingot output rises further to 62.5 per cent of capacity.

o o o

... Steel scrap stronger; new high of \$14.88 for composite.

o o o

... Automobile industry revising production schedules ahead.

A FURTHER rise in the ingot production rate to 62.5 per cent of the country's capacity, highest since early October, 1937, accompanied by strength in scrap prices which has lifted THE IRON AGE scrap composite to \$14.88, a new high for this year, is largely a reflection of the more rapid consumption of steel by the automobile industry. Government spending is a secondary factor, but of growing importance.

One independent steel company is now operating its steel-making facilities at 100 per cent and another has brought into service five new open hearth furnaces which have not hitherto been required.

Steel scrap has advanced 75c. a ton at Chicago, half that amount at Pittsburgh and is 50c. higher at Cleveland and Youngstown.

With the support of large backlogs of sheets and strip booked at recent low prices, nearly all mills will be able to maintain their present operating rates to the end of the year. If the moderate expansion of orders in other lines continues, even higher operations may be looked for this month or next. Although some products are doing as well or better than in October, the aggregate bookings this month probably will fall below those of last month owing to the large orders for sheets and strip in October.

THE reduction of \$7 a ton on tin plate, effective Nov. 10, will undoubtedly result in the release of a fairly substantial volume of orders that have been held back pending a price announcement. While the full effect may not be felt immediately, the outlook for 1939 is definitely better. This year's tin plate output will be the smallest since 1932. The action of the Carnegie-Illinois Steel Corp. in limiting the new price to the end of the

first quarter instead of the usual nine-month period, while not officially interpreted, is believed to have been taken as a measure of protection against unpredictable happenings in a disturbed foreign situation that might result in substantially higher tin prices. If there is any further change in the price at the end of the first quarter, it is more likely to be higher than lower, a situation that seems to assure heavy tin plate production in the first quarter.

WHILE election results have raised new hopes for industry, it cannot be said that tangible results have appeared within the short time that has elapsed. Those who have long-term projects in contemplation will probably be inclined to await the convening of the new Congress so that its position on disturbing problems may be more accurately appraised.

Though it is gratified over the improvement that has taken place in recent weeks, the steel industry is aware that permanent betterment cannot be founded largely on the automobile industry and government spending. A buying movement by the railroads and an expansion of private construction are essential elements that are lacking.

AS the year-end nears, buyers are taking more interest in steel prices for the first quarter. Alert to the fact that the steel companies need higher prices in order to obtain adequate profits, steel users foresee the possibility of moderate increases, but thus far no steel company has given any intimation of its intentions on 1939 prices beyond the announcement on tin plate.

THE automobile industry is revising production schedules upward as demand for cars exceeds earlier expectations. Instead of the slump that sometimes comes in January, after dealers' stocks have been supplied, it now appears likely that production will continue through the winter without serious abatement unless recurring labor troubles hinder production.

In lettings of construction steel the week has not borne out hopes of a continually rising trend. Structural steel awards, at 17,700 tons, were down from the week before, while new projects that came into the market amounted to only 15,400 tons. Reinforcing steel awards were 4750 tons, with new projects totaling 13,800 tons.

Railroad buying is light, but there is a little more activity in locomotives. The Illinois Central will build 1000 cars in its own shops.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Nov. 15, 1938	Nov. 9, 1938	Oct. 18, 1938	Nov. 16, *1937
Rails, heavy, at mill	\$40.00	\$40.00	\$40.00	\$42.50
Light rails: Pittsburgh, Chicago, Birmingham	40.00	40.00	40.00	43.00
Rerolling billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	37.00
Sheet bars: Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point	34.00	34.00	34.00	37.00
Slabs: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	37.00
Forging billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham	40.00	40.00	40.00	43.00
Wire rods: Nos. 4 and 5, Pittsburgh, Chicago, Cleveland	43.00	43.00	43.00	47.00
Skelp, grvd. steel: Pittsburgh, Chicago, Youngstown, Coatesville, Sparrows Point, cents per lb.	1.90	1.90	1.90	2.10

Finished Steel

Cents Per Lb.:	Nov. 15, 1938	Nov. 9, 1938	Oct. 18, 1938	Nov. 16, *1937
Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.25	2.25	2.25	2.45
Plates: Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont	2.10	2.10	2.10	2.25
Structural shapes: Pittsburgh, Chicago, Gary, Buffalo, Bethlehem, Birmingham	2.10	2.10	2.10	2.25
Cold finished bars: Pittsburgh, Buffalo, Cleveland, Chicago, Gary	2.70	2.70	2.70	2.90
Hot rolled strip: Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown, Birmingham	2.15	2.15	1.85	2.40
Cold rolled strip: Pittsburgh, Cleveland, Youngstown	2.95	2.95	2.65	3.20
Alloy bars: Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton	2.80	2.80	2.80	3.00
Sheets, galv., No. 24: Pittsburgh, Gary, Sparrows Point, Buffalo, Middletown, Youngstown, Birmingham	3.50	3.50	3.30	3.80
Hot rolled sheets: Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown	2.15	2.15	1.85	...
Cold rolled sheets: Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown	3.20	3.20	2.90	...

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Cents Per Lb.:	Nov. 15, 1938	Nov. 9, 1938	Oct. 18, 1938	Nov. 16, *1937
Wire nails: Pittsburgh, Chicago, Cleveland, Birmingham	2.45	2.45	2.45	2.75
Plain wire: Pittsburgh, Chicago, Cleveland, Birmingham	2.60	2.60	2.60	2.90
Barbed wire, galv., Pittsburgh, Chicago, Cleveland, Birmingham	3.20	3.20	3.20	3.40
Tin plate, 100 lb. base box: Pittsburgh and Gary	\$5.00	\$5.35	\$5.35	\$5.35

*Pittsburgh prices only.

Pig Iron

Per Gross Ton:	Nov. 15, 1938	Nov. 9, 1938	Oct. 18, 1938	Nov. 16, *1937
No. 2 fdy., Philadelphia	\$22.84	\$22.84	\$22.84	\$25.76
No. 2, Valley furnace	21.00	21.00	21.00	24.00
No. 2, Southern Cin'ti	21.06	21.06	21.06	27.89
No. 2, Birmingham	17.38	17.38	17.38	20.38
No. 2, foundry, Chicago†	21.00	21.00	21.00	24.00
Basic, del'd eastern Pa.	22.34	22.34	22.34	25.26
Basic, Valley furnace	20.50	20.50	20.50	23.50
Malleable, Chicago†	21.00	21.00	21.00	24.00
Malleable, Valley	21.00	21.00	21.00	24.00
L. S. charcoal, Chicago	28.34	28.34	28.34	30.24
Ferromanganese, seab'd carlots	92.50	92.50	92.50	102.50

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:	Nov. 15, 1938	Nov. 9, 1938	Oct. 18, 1938	Nov. 16, *1937
Heavy melting steel, P'gh..	\$15.375	\$15.00	\$14.75	\$13.75
Heavy melting steel, Phila...	14.75	14.75	14.75	12.75
Heavy melting steel, Ch'go..	14.50	13.75	13.00	12.25
Carwheels, Chicago	13.00	13.00	13.25	14.50
Carwheels, Philadelphia	16.75	16.75	16.75	16.25
No. 1 cast, Pittsburgh	15.50	15.50	15.50	16.75
No. 1 cast, Philadelphia	16.75	16.75	16.75	16.25
No. 1 cast, Ch'go (net ton)	12.75	12.75	12.25	11.50

Coke, Connellsville

Per Net Ton at Oven:	Nov. 15, 1938	Nov. 9, 1938	Oct. 18, 1938	Nov. 16, *1937
Furnace coke, prompt	\$3.75	\$3.75	\$3.75	\$4.25
Foundry coke, prompt	4.75	4.75	4.75	5.00

Non-Ferrous Metals

Cents per Lb. to Large Buyers:	Nov. 15, 1938	Nov. 9, 1938	Oct. 18, 1938	Nov. 16, *1937
Electrolytic copper, Conn...	11.25	11.25	11.25	11.00
Lake copper, New York	11.375	11.375	11.375	12.125
Tin (Straits), New York	46.50	46.625	45.25	43.00
Zinc, East St. Louis	5.05	5.05	5.05	5.75
Zinc, New York	5.44	5.44	5.44	6.10
Lead, St. Louis	4.95	4.95	4.95	4.85
Lead, New York	5.10	5.10	5.10	5.00
Antimony (Asiatic), N. Y...	14.00	14.00	14.00	16.25

The Iron Age Composite Prices

November 15, 1938
One week ago
One month ago
One year ago

Finished Steel

2.286 a Lb.
2.286
2.211
2.512c.

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

	High	Low
1938.....	2.512c., May 17	2.211c., Oct. 18
1937.....	2.512c., Mar. 9	2.249c., Jan. 4
1936.....	2.249c., Dec. 28	2.016c., Mar. 10
1935.....	2.062c., Oct. 1	2.056c., Jan. 8
1934.....	2.118c., Apr. 24	1.945c., Jan. 2
1933.....	1.953c., Oct. 3	1.792c., May 2
1932.....	1.915c., Sept. 6	1.870c., Mar. 15
1931.....	1.981c., Jan. 13	1.883c., Dec. 29
1930.....	2.192c., Jan. 7	1.962c., Dec. 9
1929.....	2.223c., Apr. 2	2.192c., Oct. 29
1928.....	2.192c., Dec. 11	2.142c., July 10
1927.....	2.402c., Jan. 4	2.212c., Nov. 1

Pig Iron

\$20.61 a Gross Ton
20.61
20.61
23.25

Based on average basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

	High	Low
23.25, June 21	\$19.61, July 6	
23.25, Mar. 9	20.25, Feb. 16	
19.73, Nov. 24	18.73, Aug. 11	
18.84, Nov. 5	17.83, May 14	
17.90, May 1	16.90, Jan. 27	
16.90, Dec. 5	13.56, Jan. 3	
14.81, Jan. 5	13.56, Dec. 6	
15.90, Jan. 6	14.79, Dec. 15	
18.21, Jan. 7	15.90, Dec. 16	
18.71, May 14	18.21, Dec. 17	
18.59, Nov. 27	17.04, July 24	
19.71, Jan. 4	17.54, Nov. 1	

Steel Scrap

\$14.88 a Gross Ton
14.50
14.17
12.92

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	High	Low
\$14.88, Nov. 15	\$11.00, June 1	
21.92, Mar. 30	12.92, Nov. 16	
17.75, Dec. 21	12.67, June 9	
13.42, Dec. 10	10.33, Apr. 23	
13.00, Mar. 13	9.50, Sept. 25	
12.25, Aug. 8	6.75, Jan. 3	
8.50, Jan. 12	6.43, July 5	
11.33, Jan. 6	8.50, Dec. 29	
15.00, Feb. 18	11.25, Dec. 9	
17.58, Jan. 29	14.08, Dec. 3	
16.50, Dec. 31	13.08, July 2	
15.25, Jan. 17	13.08, Nov. 22	

.. THIS WEEK'S MARKET NEWS ..

STEEL OPERATIONS

... Rate advances to 62.5%; one company at 100%

A FURTHER increase in steel ingot production at many plants brings the average for the country this week up to 62.5 per cent at mid-week. Heavy specifications for sheet and strip account for a large part of the increase.

The National Steel Corp. is operating at 100 per cent, all of its open-hearth furnaces at Weirton, W. Va. and Detroit being in service. Some other companies are operating at rates well above the industry's average.

The gain at Weirton has taken the WHEELING-WEIRTON district up three points to 93 per cent. The PITTSBURGH district has gained a point to 51 per cent.

At CHICAGO three companies participated in an advance which raises the rate there two and a half points to 60.5 per cent. The Inland Steel Co. has put into operation five new open-hearth furnaces, rated at 420,000 tons annually, which boost the company's total ingot producing capacity to 2,760,000 tons. Inland now accounts for 20.3 per cent of the Chicago district's steel making capacity as compared with 17.8 per cent prior to the increase.

Operations are unchanged at BUFFALO, DETROIT, BIRMINGHAM and in SOUTHERN OHIO, but have declined slightly at some other points. The rate at YOUNGSTOWN is down two points to 66 per cent, down one point to 74 per cent in the CLEVELAND-LORAIN area.

The American Iron and Steel Institute on Monday estimated the week's average at 62.6 per cent.

NEW BUSINESS

... November record may look poor alongside October's

NEW business aside from automotive requirements continues to reflect strictly hand-to-mouth purchases but individual tonnages are slightly larger and more consumers are being heard from. PITTSBURGH producers anticipate substantial increase in tin plate buying and further

improvement in the volume of heavy structural steel orders.

At CLEVELAND and YOUNGSTOWN the November record of incoming orders begins to look poor in comparison with October, but the decline does not accurately reflect current business conditions, which are holding steady. The heavy buying of flat-rolled products that started around the middle of last month gave October an abnormal bulge.

Following the election sentiment of buyers and producers is greatly improved but has not been translated into specific tonnages for steel.

Because of a decrease in the rate with which sheet and strip orders are coming in, the volume of new business in CHICAGO is somewhat lighter this week. Bar demand is improving gradually, mostly because of automobile requirements. Some tonnage is beginning to come in from implement makers for their January-February productions but present operations are still only fair. Reinforcing bar awards are increasing steadily in the CHICAGO area but most jobs are small.

Aside from the possibility that the Illinois Central may build 1000 cars in its own shops, railroad prospects continue little changed. Some likelihood exists that additional car business will be seen this year and mills are expecting some intimation next month of the carriers' 1939 rail needs.

Bids are to be taken Dec. 1 on the first section of the Chicago subway. Steel requirements are for more than 3000 tons of reinforcing steel, and an estimated 500 tons of rib beams, and 450 tons of liner plates. The entire project will call for more than 85,000 tons of steel, it is believed.

Bureau of Reclamation buying has been a strengthening factor in the Western market in the past three weeks, with further business from this source in prospect. No concrete will be placed in the base of big Shasta Dam until next summer, but structural steel and rail invitations in connection with the Southern Pacific Railroad relocation will continue to provide a fairly steady demand for structural steel and rail tonnages. Further structural steel demand by the Navy may be expected at Alameda, Cal., and Mare Island, Cal., in the immediate future.

PRICES

... Tin plate reduced \$7. Interest in first quarter quotations developing

MORE interesting than the \$7 a ton reduction on tin plate announced during the past week was the fact that the new quotations cover shipments only up to and including March 31, 1939. The general interpretation of this change in the traditional pricing of tin plate is that producers will now be in a much better position to take advantage of conditions existing at the end of the first quarter next year before making known the price for the following quarter. Uncertainty over the price of pig tin, due to Japan's Far East maneuvers, may have provided one reason for the change. Prices and contracts are now more flexible than ever before.

Interest is picking up in the subject of prices of other steel products for first quarter. There are a number of opportunities for readjustment and alinement.

Galvanized sheet quotations in the CHICAGO market are improving. Tin plate reductions will probably not bring out much new business until after Jan. 1, CHICAGO sellers believe.

PIG IRON

... Shipments at a fairly good rate. New buying dull

WHILE shipments of pig iron are going out at a fairly good rate, in some instances showing an improvement over October, the volume of new business in all markets is very light, a situation accounted for by the fact that nearly all melters are covered by contract to the end of the quarter.

The Middle West continues to show a better rate of foundry activity than other areas. CHICAGO producers report that their shipments are running ahead of those of last month, the chief factor being automotive suppliers, with a small pick-up noticeable among agricultural equipment foundries and general jobbing plants.

In the PITTSBURGH, CLEVELAND, YOUNGSTOWN and nearby areas there is no falling off in shipments, but not

much, if any, gain over October shipments is reported.

NEW ENGLAND foundries bought about 1000 tons of iron in the past week as the result of the placing of some fair-sized orders for castings. Elsewhere in the EAST melting activity appears to have slackened owing partly to holidays and partly to seasonal factors. Soil pipe and heating equipment makers in particular have curtailed operations.

Not much change in the pig iron situation is expected until around the first of the year when melters come into the market for first quarter requirements.

IRON ORE

... Season ends at Conneaut, Ohio

AT Conneaut, Ohio, ore shipments are reported ended for the season, following the arrival of a vessel from Duluth last Saturday. Since the opening of the season 267 vessels unloaded ore at Conneaut.

PLATES

... Demand is relatively light but prices are steadier

PLATES are one of the duller items in the list of steel products. In the East, where some mills are primarily engaged in plate manufacture, this situation is more apparent than elsewhere. Some mills in the PHILADELPHIA area are finding it difficult to accumulate enough tonnage to make a good rolling schedule. Shipyards are releasing occasional lots of plates, but miscellaneous business has thus far failed to improve to the extent that had been expected. One or two mills have been helped out by the release of export orders taken in the summer, but much of this backlog has been worked off and little in the way of replacement is appearing. What is needed most is a revival of railroad equipment buying, which probably will not eventuate until the new Congress has worked out a plan of railroad aid.

At CHICAGO the chief demand is from structural fabricators. Railroad orders are very light and tank building activity is only fair. The first section of the CHICAGO subway will require an estimated 450 tons of liner plates, with considerable more to come as the project develops. Bids on this section are due Dec. 1.

A pipe line for Sandusky, Ohio, requiring 1000 tons of plates, has been

awarded to Taylor Forge & Pipe Co., Chicago, through Thatcher Brothers, Toledo.

Nearly 1000 tons of gates and conduit linings are up for bids the end of this month for Western dams. Bids will be taken by the Bureau of Reclamation, Denver.

Refinery equipment manufacturers are bidding on distillation and cracking apparatus for Argentine oil companies.

Prices on plates are steadier, concessions being less common, according to reports from various centers.

SEMI-FINISHED STEEL

... Orders for tin bars expected following tin plate price announcement

NEW business at PITTSBURGH in the past week was about equal to a week ago in volume. Clarification of the tin plate price will start a flow of tin plate bars to non-integrated mills. This movement will be sizable owing to low or non-existent stocks.

STRUCTURAL STEEL

... Veterans' Hospital in New York takes 3050 tons

THE largest structural award in the NEW YORK area during the past week was 3050 tons, going to American Bridge Co., for the Veterans' Hospital in the Bronx while the large number of projects in contractors' hands indicates the lull in the market is temporary. One thousand tons will be required for a school at Bloomfield, N. J.

At PHILADELPHIA a contract for 2400 tons of shapes for the Philadelphia municipal court house was let, the material to be supplied by Bethlehem Steel Corp. Other awards there in a market which shows little small-tonnage private construction, includes 1130 tons for a highway bridge, and the same tonnage for a Navy Yard pipe and coupling shop. Since the State of Pennsylvania's \$400,000,000 construction program has bogged down due to lack of funds, work of this nature coming up for the remainder of 1938 and much of 1939 is likely to decline.

Meanwhile CHICAGO reports several small awards, one of 1570 tons for a bridge in Nebraska. First section of

the Chicago subway, with bids due Dec. 1, will require an estimated 500 tons of rib beams and 3500 tons of other types of steel.

Structural steel specifications at PITTSBURGH gained slightly in the past week with average tonnages recently showing only minor fluctuations. Considerable improvement in demand is expected during the next five months. On the WEST COAST bids were to be opened Nov. 15 on transmission towers for the Los Angeles Department of Water and Power, with 12,000 tons of shapes involved. Two large highway projects in the FAR WEST, totaling 1750 tons, are up for bids.

Steel for two schools at Lockport, N. Y., in the BUFFALO district, will require 1000 tons of shapes. Bids will close Nov. 28.

(Details of fabricated structural steel awards and inquiries—page 88.)

Bids were to have been taken next month on a 3000-ton bridge over the Chicago River at State Street but dissension within the City Council has held this job up indefinitely. THE IRON AGE learned this week. To be built in conjunction with the new subway, this bridge and connecting viaduct to Wabash Avenue are certain future projects. The substructure will require nearly 1000 tons of bars and shapes while the viaduct will require over 1600 tons of steel. The two complete jobs will total about 5600 tons.

SHEETS AND STRIP

... Pressure is on production to get out tonnage before year-end

EMPHASIS continues on production with deliveries on cold rolled sheets well extended. Cold mills will be taxed to the limit to get out recently booked business by the year-end. New orders at PITTSBURGH are miscellaneous and involve no large tonnages. Shipments are heavy from all mills. At CLEVELAND and YOUNGSTOWN it is noted with some surprise that a moderate demand has been developed for sheets and strip at the 2.15c. quotations. The amount of such new business is heavier than expected in view of the heavy covering last month. At CHICAGO some furnace manufacturers are specifying above the quantities they thought they would require.

Mills continue to bring pressure on customers for early specifications so that low-priced tonnage can be worked off the books, if possible, by the end

of the year. These efforts have worked so well in some instances that a carry-over through January of some tonnage is probable.

RAILROAD BUYING

... Locomotive inquiries and orders encourage trade

ALTHOUGH railroad buying of major proportions probably will not develop until a plan of railroad aid has been worked out in Washington, some encouragement is derived from recent inquiries and orders for locomotives. The Reading-Central of New Jersey will purchase 15 diesel-electric switching engines, the Columbus & Greenville is taking bids on five steam locomotives, the Kansas City Terminal Railroad has ordered three diesel switching locomotives (two from Electro-Motive Corp. and one from American Locomotive Co.), the Sorocabana Railway of Brazil has ordered four locomotives from American Locomotive Co., and the White Pass & Yukon Route of Alaska has ordered one of the 2-8-2 type from American Locomotive Co.

It is announced that the Illinois Central, which recently ordered 1000 freight cars on a lease-purchase basis, will also build 1000 cars in its own shops.

There are no developments to indicate whether the railroads will place their customary orders for rails and track fastenings before the end of the year. Orders for car parts and accessories are improving, chiefly because the railroads have been robbing cars for such parts and now must replace them.

WIRE PRODUCTS

... Market shade stronger with rod shipments heavier

DEMAND for manufacturers' wire continues to supply most of the momentum for CLEVELAND mills. Merchant products have shown slight gains due principally to activity of jobbers, but carload buying from agricultural areas is dead. Shipments of rods to bolt and nut manufacturers are heavy. Prices on merchant products are still weak in a few spots throughout the nation, but in general the market is firmer than in the early fall.

Current bookings at PITTSBURGH are slightly ahead of a month ago at

this time. Merchant wire products are holding up better than seasonal expectations. Manufacturers' wire is still in good demand because of automotive activity which continues to be the greatest factor in wire demand in the CHICAGO district. General manufacturing plants there are requiring some wire products but the makers of motor cars and their suppliers are the dominant force in the present situation. Wire requirements for farm uses are little changed.

REINFORCING BARS

... 2000 tons awarded for Massachusetts flood control

THE largest award of the week was 2000 tons for Massachusetts flood control work, three companies sharing in the tonnage. Bids will be taken Dec. 1 on the first section of the Chicago subway, which will require 3000 tons of bars. Total bar requirements for the subway may be 25,000 tons. An underpass in Washington calls for 900 tons.

Prices are still highly competitive.

BOLTS, NUTS, RIVETS

... Orders show moderate improvement

ORDERS at PITTSBURGH are slightly more active, especially from railroad and structural sources. Releases from automobile centers are coming in at an accelerated rate. Operations approximate 40 per cent.

CLEVELAND rivet makers report business prospects and prices have become better together recently, with construction, shipbuilding and boiler and tank work predominant.

COLD FINISHED BARS

... Demand from Detroit brings slight pickup in buying

WITH automotive demand still in the forefront, producers note a slight pickup in miscellaneous business. Farm implement makers and textile machine manufacturers are buying little or no material. Current purchases just about match consumption, hence orders would reflect any marked improvement in general business conditions.

Cold rolled bars in the smaller sizes are moving fairly well in NEW

ENGLAND, but the heavy machinery builders in the East seem to have ample stocks for present requirements and are not ordering heavier bars.

TIN PLATE

... Price reduced to \$5 a base box through first quarter

CARNEGIE-ILLINOIS STEEL CORP. late last week announced a price of \$5 per base box on tin plate, effective Nov. 10, and applying on shipments through the first three months of 1939, a reduction of \$7 a ton. Special coated manufacturing ternes were marked down to \$4.30 per base box with the same shipping conditions. The announcement is being interpreted as possibly the beginning of quarterly prices on tin plate. Heretofore producers have been committed to a price for nine months regardless of what conditions might arise during that period. Under the new setup, producers may gage tin plate market conditions before committing themselves to a price for delivery during the following quarter. Meanwhile, an increase in releases and a substantial volume of new tin plate business is expected before the year-end.

Tin plate producers look forward to considerably larger output in 1939, this year having been the poorest since 1932. In the first nine months, according to official figures of the American Iron and Steel Institute, production averaged only about 41 per cent, which is far below normal.

WAREHOUSE BUSINESS

... Jobbers' orders gaining ... Outlook good

OCTOBER having been a good month for CHICAGO jobbers, increased business is predicted for 1939. Current demand, spurred on by consumers' desires to hold down year-end inventories, is good. Jobbers are specifying freely with the mills. Sales are characterized by a broad diversification.

Steel jobbers in the CINCINNATI area report a steady improvement through November. Current sales are above October's with no likelihood of tapering.

At BUFFALO the outlook has brightened considerably. Orders have grown steadier and are expected to be better

in the spring. Demand for the heavier lines has been increasing of late. Sheets are moving well.

TUBULAR GOODS

... Standard pipe in slightly better demand

CURRENT tubular sales at PITTSBURGH are little changed in volume from a week ago. Oil-country demand is stationary with further gains in standard pipe requirements.

The CLEVELAND market hears that a 5000-ton Venezuela line for a subsidiary of Gulf Oil has been awarded to National Tube Co., Pittsburgh. A 1000-ton intake line at Sandusky, Ohio, has been awarded to Taylor Forge & Pipe Co., Chicago.

Some buying is reported from the Illinois oil fields, near St. Louis, where there is considerable activity. In the mid-continent fields, no programs for 1939 have been issued.

MERCHANT BARS

... Specifications gain slightly at some centers

INCOMING specifications show moderate improvement at CLEVELAND and YOUNGSTOWN and are well diversified as to consuming sources. The machinery, automotive and implement industries are prominent among current buyers.

Diversification in hot rolled bar sales at PITTSBURGH continues to expand. Individual tonnages are slightly larger and current business is gaged closely to ultimate demand. Total bookings are on a par with a week ago.

With farm machinery plants still operating only at a moderate rate, auto demands are accounting for most of the bar activity in CHICAGO mills. Industrial tractor production is also stimulating order books.

	1928-1932		1933-1937		10-Year Total	
	Tons	Ratio	Tons	Ratio	Tons	Ratio
Tin plate	848,627	11.1%	1,002,104	13.9%	1,850,731	12.4%
Black steel sheets	620,823	8.1	654,929	9.1	1,275,754	8.6
*Plate	529,607	6.9	610,731	8.5	1,140,338	7.7
Plain shapes	735,321	10.5	281,407	3.9	1,016,728	6.8
Pig iron	153,753	2.0	798,705	11.1	952,458	6.4
*Steel bars	522,247	6.8	337,589	4.7	859,836	5.8
Galvanized sheets	475,304	6.2	341,295	4.7	816,599	5.5
Skelp	464,574	6.1	291,862	4.1	756,436	5.1
Heavy rails	396,256	5.2	354,673	4.9	750,929	5.0
Casing and oil-line pipe ..	334,514	4.4	230,664	3.2	565,178	3.8
Steel ingots, etc.	99,410	1.3	422,649	5.7	522,059	3.5
Barbed wire	201,500	2.6	164,904	2.4	366,404	2.5
Welded black steel pipe ..	266,156	3.5	83,377	1.2	349,533	2.4
Wire rods	167,575	2.2	161,579	2.2	329,154	2.2
Strip steel, hot-rolled ..	152,108	2.0	166,028	2.3	318,136	2.1
Fabricated shapes	107,590	1.5	202,836	2.8	310,426	2.1
Welded galvanized steel pipe	150,824	1.9	88,903	1.3	239,727	1.6
Galvanized wire	79,641	1.0	99,498	1.5	179,139	1.4
Strip steel, cold-rolled ..	62,159	0.8	101,337	1.4	163,496	1.1
Plain wire	61,036	0.8	101,455	1.4	162,491	1.1
"Other" shapes	136,297	1.8	23,644	0.3	159,941	1.0
Car wheels and axles ..	62,639	0.8	65,666	0.9	128,305	0.9
Unlined tanks	35,804	0.5	85,721	1.2	121,525	0.8
Rail joints, etc.	66,865	0.9	48,148	0.7	115,013	0.8
Wire nails	55,254	0.7	59,726	0.8	114,980	0.8
Cast-iron pressure pipe and fittings	53,853	0.7	60,580	0.8	114,433	0.8
Light rails	80,388	1.1	29,276	0.4	109,664	0.7
Boiler tubes	63,686	0.8	45,639	0.6	109,325	0.7
TOTALS	6,983,813	91.2	6,914,925	96.0	13,898,738	93.6
ALL EXPORTS	7,651,219	100.0	7,202,648	100.0	14,853,867	100.0
* All classes.						

Tin Plate Leads 10-Yr. Export Total

SHIFTING trends of export trade of the United States in iron and steel products (excluding scrap), for the ten years ended Dec. 31, 1937, is shown by the Metals and Minerals Di-

vision, Bureau of Foreign and Domestic Commerce, in the above table. The table contrasts shipments in two 5-yr. periods and shows that tin plate led in both periods.

Ship Bids Received By Maritime Commission

WASHINGTON.—The Maritime Commission received bids from seven companies last week for the construction of the C-3 passenger-cargo steel ships, on which bids were invited Oct. 1 for an undisclosed number. Firms bidding were:

Newport News (Va.) Shipbuilding & Dry Dock Co.; Bethlehem Shipbuilding Corp., New York; Ingalls Iron Works Co., Birmingham; Pennsylvania Shipyards, Inc., Beaumont,

Tex.; Moore Dry Dock Co., San Francisco; Federal Shipbuilding & Dry Dock Co., Kearny, N. J.; and the Sun Shipbuilding & Dry Dock Co., Chester, Pa.

Bids were based on both a fixed and adjusted price basis for any number of ships up to six, the maximum number any one company will be permitted to build.

The combination ships, of approximately 11,926 deadweight tonnage, are estimated to require about 4370 tons of steel and form part of the merchant marine expansion.

Weekly Bookings of Construction Steel

	Week Ended				Year to Date	
	Nov. 15, 1938	Nov. 9, 1938	Oct. 18, 1938	Nov. 16, 1937	1938	1937
Fabricated structural steel awards	17,700	23,725	11,900	18,800	787,645	976,385
Fabricated plate awards	1,545	1,600	11,790	0	117,365	124,165
Steel sheet piling awards	400	5,435	705	0	43,700	57,580
Reinforcing bar awards	4,750	6,400	11,015	3,950	293,240	252,590
Total Letting of Construction Steel ..	24,395	37,160	35,410	22,750	1,241,950	1,410,720

FABRICATED STEEL

. . . Lettings decline to 17,700 tons from 23,725 tons last week . . . New projects lower at 15,400 tons as against 27,000 tons a week ago . . . Plate awards call for 1545 tons.

NORTH ATLANTIC STATES

AWARDS

- 3050 Tons, New York, Veterans' administration building in Bronx, to American Bridge Co., Pittsburgh.
- 2400 Tons, Philadelphia, court house, to Bethlehem Steel Co., Bethlehem, Pa.
- 1130 Tons, Philadelphia, highway bridges, Allegheny Avenue and 21st-22nd Streets, to Fort Pitt Bridge Works Co., Pittsburgh.
- 1130 Tons, Philadelphia, pipe and copper shop, Navy Y-rd, to Bethlehem Steel Co., Bethlehem, Pa.
- 1000 Tons, New York, public school No. 194, to Harris Structural Steel Co., Plainfield, N. J.
- 345 Tons, New York, Harlem River speedway, to American Bridge Co., Pittsburgh; Wood & Hagan, Inc., general contractor.
- 250 Tons, Southport-Boothbay Harbor, Me., bridge, to Lackawanna Steel Construction Corp., Buffalo.
- 245 Tons, Jersey City, N. J., Tonnel Avenue bridge, to American Bridge Co., Pittsburgh; J. P. Burns Co., general contractor.
- 145 Tons, New York, World's Fair building for Carrier Corp., to Bethlehem Fabricators, Inc., Bethlehem, Pa.; Thompson Starrett Co., general contractor.

THE SOUTH

- 1330 Tons, Charleston, S. C., crane runways at Navy Yard, to Belmont Iron Works, Philadelphia.
- 225 Tons, Ulvah, Ky., bridge, to St. Louis Structural Steel Co., St. Louis.
- 165 Tons, Guntersville, Ala., switchyard to International Derrick & Equipment Co., Columbus, Ohio.
- 155 Tons, Walthall County, Miss., bridge, to Jones & Laughlin Steel Corp., Pittsburgh; M. E. Gilloz, Inc., general contractor.
- 150 Tons, Charleston, S. C., extension to administration building and store house, to Bristol Steel & Iron Works, Bristol, Va.
- 135 Tons, Madison and Walker Counties, Tex., bridge, to North Texas Iron & Steel Co., Fort Worth, Tex.
- 135 Tons, Atlanta, Ga., skyline Mfg. Co., building, to Ingalls Iron Works Co., Birmingham.
- 135 Tons, Atlanta, Ga., Cumberland Mfg. Co. building, to Ingalls Iron Works Co., Birmingham.
- 130 Tons, Chickamauga, Tenn., roof frames, to Lakeside Bridge & Steel Co., Milwaukee.
- 125 Tons, Cass and Marion Counties, Tex., bridge, to Mosher Steel Co., Houston, Tex.

CENTRAL STATES

- 1585 Tons, Rulo, Neb., Missouri River bridge, to Omaha Steel Works, Omaha, Neb.
- 450 Tons, St. Louis, Wheeling Corrugated Co., warehouse, to Austin Co., Cleveland.
- 350 Tons, Chicago, building for J. H. Stone & Son Co., to Joseph T. Ryerson & Son, Inc.; through B. W. Handler, contractor.

- 350 Tons, Lincoln, Neb., 48th Street subway, to Omaha Steel Works; through Dobson & Robinson.
- 300 Tons, Manistee, Mich., bridge, to Wisconsin Bridge & Iron Works, Milwaukee.
- 225 Tons, Lodi, Wis., bridge, to Duffin Iron Works, Chicago.
- 200 Tons, Minneapolis, bridge, to Minneapolis-Moline Power Implement Co., Minneapolis; through L. N. Feller, contractor.
- 175 Tons, Cincinnati, alterations to incinerator plants, to Oregon Bridge Co., Lebanon, Ohio.
- 165 Tons, Detroit, building, Boys' Club of Detroit, to Roura Iron Works, Detroit.
- 155 Tons, State of Nebraska, bridge over Dry Sandy Creek for Union Pacific Railroad, to Paxton & Vierling Iron Works, Omaha, Neb.
- 145 Tons, Bensonville, Ill., bridge, to Lakeside Bridge & Steel Co., Milwaukee.
- 135 Tons, Peru, Ill., high school, to New City Iron Works, Chicago; Milton Pelling, contractor.
- 110 Tons, La Crosse, Wis., vocational school, to C. Hennecke Co., Milwaukee.
- 100 Tons, Crawford County, Wis., bridge, to Lakeside Bridge & Steel Co., Milwaukee.
- 100 Tons, Monroe County, Wis., bridge, to Lakeside Bridge & Steel Co., Milwaukee.

WESTERN STATES

- 495 Tons, San Clemente Island, Cal., hangar, to Western Pipe & Steel Co., San Francisco.
- 285 Tons, Mare Island, Cal., lumber storehouse, to Judson-Pacific Co., San Francisco.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

- 1000 Tons, Lockport, N. Y., two high schools; bids close Nov. 28.
- 1000 Tons, Bloomfield, N. J., Junior High School.
- 600 Tons, New London, Conn., two buildings for submarine base.
- 500 Tons, Brooklyn, public school No. 221; bids close Nov. 21.
- 350 Tons, Washington, K Street overpass; bids in.
- 215 Tons, Gardiner-Randolph, Me., State highway bridge.
- 200 Tons, Naples, N. Y., school; bids due Nov. 30.
- 135 Tons, Sandisfield, Mass., State bridge over Clam River.
- 125 Tons, Princeton, Me., State highway bridge.
- 125 Tons, Lackawanna County, Pa., State highway bridge.
- 120 Tons, Amelle, Md., building for Celanese Corp.

Unstated tonnage, Buffalo, Willert Park housing project; bids close Dec. 9.

THE SOUTH

- 2000 Tons, Oklahoma and Texas, Red River bridge, Waurika-Wichita Falls.
- 1600 Tons, Durham, N. C., factory building, American Tobacco Co.

- 600 Tons, Owensboro, Ky., cutting edges for piers, Ohio River bridge.

CENTRAL STATES

- 765 Tons, State of Wisconsin, six bridges; bids Nov. 18.
 - 500 Tons, Chicago, first section of subway; rib beams for bids Dec. 1.
 - 325 Tons, Caledonia, N. D.-Shelby, Minn., bridge for states of North Dakota and Minnesota.
 - 325 Tons, Cummings, N. D.-Neillville, Minn., bridge for states of North Dakota and Minnesota.
 - 200 Tons, Benton Harbor, Mich., bridge.
 - 125 Tons, Cincinnati, addition to Procter & Gamble office building.
 - 125 Tons, Indianapolis, armory.
 - 115 Tons, Cleveland, building for Greyhound Lines. National Concrete & Fireproofing Co., general contractor.
- Unstated tonnage, Rantoul, Ill., buildings for Army Air Corps.

WESTERN STATES

- 1000 Tons, Gardiner, Mont., bridge, for Bureau of Public Roads.
- 922 Tons, Yellowstone National Park, Wyo., highway bridge for Bureau of Public Roads, Denver; bids Dec. 6.
- 828 Tons, Turlock, Cal., overcrossing; bids Nov. 30.
- 480 Tons, Bonneville Dam, power house; bids by United States Engineer Dec. 19.
- 450 Tons, Great Falls, Mont., municipal airport.
- 200 Tons, Los Angeles, Mariposa Street bridge.
- 190 Tons, Eads, Colo., State grade crossing elimination.
- 136 Tons, Winnemucca, Nev., overpass; bids Nov. 22.
- 120 Tons, Kremmling, Colo., highway bridge 1135-D, Bureau of Reclamation.

FABRICATED PLATES

AWARDS

- 1000 Tons, Sandusky, Ohio, 42-in. intake line, to Taylor Forge & Pipe Co., Chicago, through Thatcher Brothers, Toledo.
- 400 Tons, Cleveland, 30-in. pipe for Republic Steel Co., to Republic Steel Corp.
- 145 Tons, Ambler, Pa., standpipe, to Chicago Bridge & Iron works, Chicago.

NEW PROJECTS

- 475 Tons, Crownover, Wash., roller gates, load disks and auxiliary load rings for Roza diversion dam, Yakima project (Specification 810); bids Nov. 29.
- 335 Tons, Kremmling, Colo., ring-seal gates and conduit units for Green Mountain Dam (Specification 811); bids Nov. 30.
- 275 Tons, Lapine, Ore., ring-follower gates and conduit units for Wickiup Dam, Deschutes project (Specification 812); bids Dec. 1.

SHEET PILING

AWARDS

- 400 Tons, Cleveland, Cuyahoga River straightening project, to Bethlehem Steel Co., Bethlehem, Pa., through L. A. Wells Construction Co.

... NON-FERROUS ...

... Post-election spurt boosts week's spelter sales to 10,165 tons ... Battery makers active in lead market.

WITH the exception of a short-lived spurt in sales on Thursday and Friday, generally credited to the enthusiasm of industrial buyers over the trend of the recent elections, non-ferrous metal buyers are again assuming a policy of cautious hand-to-mouth buying. In the absence of any important development in the domestic picture, the foreign situation is again dominating the market. The feeling that the latest anti-Semitic outburst in Germany may have world-wide re-

percussions has encouraged some speculative buying abroad, but thus far this business has not amounted to any important tonnage. The domestic copper picture remains featureless. Sales for the present month through Saturday amount to 6400 tons, as compared with 55,600 tons in a like period in October. Prices are unchanged at 11.25c. per lb., Connecticut Valley for electrolytic metal. Sales by the cartel group are on a fairly level basis, but prices have been moving downward,

due to a great extent to the new weakness in sterling. This morning's foreign price of 11c. compares with 11.30c. a week ago.

LEAD bookings in the week past were about 6000 tons, or 700 tons less than the previous week. Most of this loss was due to the average price contracts which were included in the preceding week's total and not to any change in the rate of domestic buying. The feature of the market in the past week was the activity of battery makers in December positions, a reflection of the improving automobile production. Domestic prices are firm and unchanged at 4.95c. per lb., St. Louis, while the foreign price has eased to 3.36c. per lb., against 3.52c. a week ago.

ZINC sales in the week past amounted to 10,165 tons against 1903 tons in the previous week. Most of this business was the result of a burst of post-election enthusiasm which subsided as quickly as it rose. Other than this spurt, during which first quarter demands predominated, the market has been very quiet. Quotations remain firm at 5.05c., East St. Louis. As the seasonal peak of galvanizing operations has been reached, the remainder of the year will probably see a modest recession in the rate of consumption and sellers, consequently, are not expecting any heavy demand for spelter until the turn of the year, barring unforeseen external developments which would encourage speculative covering.

TIN—A combination of bullishness over the turn of the elections and the reductions in tin plate prices was responsible last week for one of the most active weeks the tin market has experienced in a long time. Buying was centered mainly in the first quarter, with tin mill interests providing the bulk of the support. Despite the good volume of sales, the sharp drop in the sterling rate abroad forced prices here down to a low of 46.50c., today's Straits metal price in New York, after touching 46.85c. on Friday.

NON-FERROUS PRICES Cents per lb. for early delivery

	Nov. 10	Nov. 11	Nov. 12	Nov. 14	Nov. 15
Electro, copper ¹	11.25	11.25	11.25	11.25	11.25
Lake copper	11.375	11.375	11.375	11.375	11.375
Straits, tin, New York	46.65	46.85	....	46.70	46.50
Zinc, East St. Louis ²	5.05	5.05	5.05	5.05	5.05
Lead, St. Louis ³	4.95	4.95	4.95	4.95	4.95

¹ Delivered Conn. Valley, deduct ¼c. for New York delivery. ² Add 0.39c. for New York delivery. ³ Add 0.15c. for New York delivery.

Warehouse Prices

Base per lb., Delivered

New York Cleveland

Tin, Straits pig	47.50c.	50.75c.
Copper, lake	12.25c.	12.375c.
Copper, electro	11.50c.	12.375c.
Copper, castings	11.25c.	11.875c.
*Copper sheets, hot-rolled	19.375c.	19.375c.
*High brass sheets	17.50c.	17.50c.
*Seamless brass tubes ..	20.25c.	20.25c.
*Seamless copper tubes ..	19.875c.	19.875c.
*Brass rods	13.375c.	13.375c.
Zinc slabs	6.50c.	7.50c.
Zinc sheets, No. 9 casks	10.50c.	12.10c.
Lead, American pig....	5.875c.	5.60c.
Lead, bar	6.625c.	8.75c.
Lead sheets, cut	8.25c.	8.25c.
Antimony, Asiatic	15.00c.	17.75c.
Alum., virgin, 99 per cent plus	22.50c.	22.50c.
Alum., No. 1 remelt., 98 to 99 per cent	19.50c.	19.50c.
Solder, ½ and ½	29.25c.	30.25c.
Babbitt metal, commercial grade	23.25c.	23.00c.

* These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33 1/3; on brass sheets and rods, 40, and on brass and copper tubes, 25.

Old Metals Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible..	8.75c.	9.50c.
Copper, hvy. and wire	7.75c.	8.25c.
Copper, light and bottoms	7.00c.	7.25c.
Brass, heavy	4.75c.	5.25c.
Brass, light	3.875c.	4.625c.
Hvy. machine composition	7.00c.	8.50c.
No. 1 yel. brass turnings	4.50c.	5.00c.
No. 1 red brass or compos. turnings	6.75c.	7.375c.
Lead, heavy	4.00c.	4.875c.
Cast aluminum	7.50c.	8.75c.
Sheet aluminum	11.75c.	13.25c.
Zinc	2.50c.	3.75c.

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered; virgin 99 per cent plus, 20c.-21c. a lb.; No. 12 remelt, No. 2 standard, 19c.-19.50c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt, New York; Asiatic, 14c. a lb., f.o.b.; American, 12.25c. a lb. QUICK-SILVER, \$72-\$74 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 11.625c. a lb. lcl.

Imports at Philadelphia

PHILADELPHIA.—The following iron and steel imports were received here during the past week: 24 tons of manganese ore from British India; 5 tons of steel tubes and 15 tons of steel forgings from Sweden; and 6 tons of steel bars and 4 tons of structural shapes from Belgium.

IRON AND STEEL SCRAP

... Strong markets at Chicago and Pittsburgh boost composite 38c. to \$14.88, new high for 1938.

NOV. 15.—A mill sale has raised the price of No. 1 heavy melting steel 75c. at Chicago, and unusual market conditions at Pittsburgh warrant showing a spread of 75c. a ton in the quotation of heavy melting steel and result in an increase of 37½c. in the average price there. With no change in eastern Pennsylvania prices, the net increase in THE IRON AGE composite figure for the prime grade is 38c., making the average \$14.88, a new high for the year and 5c. above the previous peak of \$14.83 calculated on Aug. 9. In the interim, the average had dipped to a valley of \$14.17 on Oct. 18, held that figure for a week, then climbed back at an accelerated pace. Prices on other items in the Chicago market followed the leading grade, but at Pittsburgh only those grades that tie in very closely with No. 1 steel have been advanced. No. 1 steel is up 50c. a ton at Cleveland and Youngstown as a result of mill sales around 10,000 tons, although at Buffalo the sale of 8000 tons of No. 2 to a local consumer failed to have any effect on published prices. Dealer bids at Cincinnati are much stronger, although no sales into consumption are reported. Signs of strength are seen at Detroit, but there are no changes pricewise. Some items at St. Louis are up 50c. to \$1.

The export market continues strong, but broker buying prices are unchanged.

Pittsburgh

A fair tonnage of No. 1 heavy melting steel was purchased in the immediate Pittsburgh district last week by a consumer for \$15 a ton. Some brokers are already paying this figure to cover. Other brokers in this district, however, are paying \$15.50 a ton for No. 1 for delivery within the district at a price commanding at least \$15.75 a ton into consumption. No. 1 steel this week is quotable at the unusual range of \$15 to \$15.75, which takes into account current market conditions. This makes the average price of No. 1 37.5c. a ton higher than a week ago when the range was \$14.75 to \$15.25.

Chicago

A mill sale has raised the price of heavy melting steel 75c. a ton to \$14.25 to \$14.75. Brokers are currently paying up to \$14.50 for No. 1 steel and the market is very strong. It appears now that Chicago district operations will remain around the 60 per cent mark for the remainder of the year, thus indicating

scrap quotations at least as high as those quoted currently. Reports have been heard that some scrap may be brought into this district by boat, but the scarcity of vessels and an increase in rates makes this possibility rather remote.

Philadelphia

With operations here lagging far behind the national average, there is a general disinclination on the part of local plants to make additional scrap commitments. Even deliveries on old orders are being held up in certain instances, although the past week has seen some improvement in aggregate releases. Heavy breakable cast is none too strong at near \$16, but some specialties, as for instance shafting, is showing a little more life. To export belongs the credit for keeping the price structure here steady. No. 1 and No. 2 continue to bring \$14 and \$13 respectively at Port Richmond; one boat left this morning and another is due in to load within the fortnight. One boat, the *Felix*, which cleared last week for Europe carried a moderate tonnage of Budd Co. bundles as part of the cargo.

Youngstown

In view of large purchases by two of the leading interests late last week and early this week, the market on No. 1 heavy melting is up 50c. per ton to a range of \$15 to \$15.50. The latest transaction involves a tonnage of railroad heavy melting and No. 1 and substantiates the \$15.50 top figure. A few days earlier heavy buying by another steel producer for several plants in the Valley had temporarily established No. 1 at \$15.25.

Cleveland

A new sale of approximately 10,000 tons to one of the large producers in the Cleveland-Lorain area has strengthened the local market. No. 1 heavy melting steel is now quoted up 50c. per ton to a range of \$14 to \$14.50 and No. 2 heavy melting steel is quoted up \$1 a ton to a range of \$13.50 to \$14. The latest transaction is the second large purchase consummated in the past month. The sale of No. 2 to this mill is unusual.

Buffalo

Highlighting the market this week is the sale of 8000 tons of No. 2 heavy melting steel to a large consumer in the district at a price reported to be \$12 to \$12.50. The last two sizable orders in this area have taken a good part of the surplus scrap in existence and it is felt that future sales will take place at higher prices.

St. Louis

The scrap iron market is firm, and some items are from 50c. to \$1 a ton higher than the preceding week. The

strength in the market is due to a tightening of receipts, and inclination of dealers to hold their stocks for higher prices. An East Side mill is expected to buy a sizable tonnage of heavy melting steel within a week. Railroad lists: Louisville & Nashville, 6700 tons; Southern, 3100 tons; Gulf Coast Lines, 200 tons.

Cincinnati

The old materials market is at all but a standstill. Dealers' bids, however, are stronger and tend upward for technical purposes, but trading is nil. Supplies are being closely held in anticipation of early mill interest in coverage. Some mill buying is reported, but this lacks vigor.

Detroit

Greater strength which promises soon to end the sidewise price movement in the Detroit scrap area has manifested itself. The items of particular strength in the last week include all classes of borings and turnings and No. 2 heavy melting steel. The former are being bought by one dealer at \$6.75 delivered to the consumer near Detroit. Heavy melting steel is being laid down on the docks at \$9.50, which is about the equivalent of the maximum being quoted in THE IRON AGE. An inquiry for approximately 20,000 tons of railroad heavy melting steel or equivalent failed to develop into an order but lent support to the optimism of local dealers. The recent upset in turnings prices in this area is attributed to the fact that cast scrap is being melted in a local open hearth for refining in other furnaces, supplementing the supply of hot metal from blast furnaces.

Boston

With the advance of 50c. a ton or more on No. 1 heavy melting steel at Pittsburgh, consumers in that district raised their price for bundled skeleton 40c. a ton to \$7.65 a ton f.o.b., but the new price so far has failed to bring out much material. Owners of scrap continue to concentrate on the export market, preferring to accumulate all material that cannot be exported until the market is higher. Exporters still maintain it is growing more and more difficult to obtain No. 1 steel, and add that during the past few days really desirable No. 2 steel is not as plentiful as heretofore. No sale of export No. 1 steel the past week was reported at less than \$13.25 a ton on dock, an indication the market is firmer.

New York

The local market is without feature. Very little material is going into eastern Pennsylvania, and prices of scrap on cars are largely nominal. With a large bank of unfilled orders from Europe and the Orient, the export market continues strong, but steady, with no change in broker buying prices.

Osborn Mfg. Co., Cleveland, maker of brushes and molding machines, has purchased the assets of the Johns Conveyor Corp., Newark, N. J., and has obtained the exclusive patent rights to manufacture and sell this conveyor in the United States.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	\$15.00 to \$15.75
Railroad hvy. mltng.	15.75 to 16.25
No. 2 hvy. mltng. steel	14.00 to 14.50
Scrap rails	16.00 to 16.50
Rails 3 ft. and under.	17.00 to 17.50
Comp. sheet steel	15.00 to 15.75
Hand bundled sheets.	14.00 to 14.50
Hvy. steel axle turn.	13.75 to 14.25
Machine shop turn.	9.75 to 10.25
Short shov. turn.	9.75 to 10.25
Mixed bor. & turn.	8.25 to 8.75
Cast iron borings.	8.25 to 8.75
Cast iron carwheels.	14.50 to 15.00
Hvy. breakable cast.	12.50 to 13.00
No. 1 cupola cast.	15.25 to 15.75
RR. knuckles & cplrs.	16.50 to 17.00
Rail coil & leaf springs.	16.50 to 17.00
Rolled steel wheels.	16.50 to 17.00
Low phos. billet crops.	17.50 to 18.00
Low phos. punchings.	16.50 to 17.00
Low phos. plate	16.50 to 17.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	\$14.50 to \$15.00
No. 2 hvy. mltng. steel.	13.00 to 13.50
Hydraulic bund., new.	14.50 to 15.00
Hydraulic bund., old.	11.50 to 12.00
Steel rails for rolling.	17.00 to 17.50
Cast iron carwheels.	16.50 to 17.00
Hvy. breakable cast.	16.00
No. 1 cast	16.50 to 17.00
Stove plate (steel wks.)	13.00 to 13.50
Railroad malleable	15.50 to 16.00
Machine shop turn.	8.00 to 8.50
No. 1 blast furnace.	6.50 to 7.00
Cast borings	6.50 to 7.00
Heavy axle turnings.	10.00 to 10.50
No. 1 low phos. hvy.	16.50 to 17.00
Couplers & knuckles.	16.50 to 17.00
Rolled steel wheels	16.50 to 17.00
Steel axles	21.50 to 22.00
Shafting	20.00 to 20.50
Spec. iron & steel pipe	12.00 to 12.50
No. 1 forge fire	11.00 to 11.50
Cast borings (chem.)	9.50 to 10.00

CHICAGO

Delivered to Chicago district consumers:

Per Gross Ton		
Hvy. mltng. steel	\$14.25 to \$14.75	
Auto. hvy. mltng. steel alloy free	12.75 to 13.25	
No. 2 auto. steel	11.50 to 12.00	
Shoveling steel	14.25 to 14.75	
Factory bundles	13.25 to 13.75	
Dealers' bundles	12.25 to 12.75	
Drop forge flashings.	11.75 to 12.25	
No. 1 busheling	12.75 to 13.25	
No. 2 busheling, old.	6.50 to 7.00	
Rolled carwheels	15.50 to 16.00	
Railroad tires, cut.	16.50 to 17.00	
Railroad leaf springs.	16.00 to 16.50	
Steel coup. & knuckles	15.50 to 16.00	
Axle turnings	13.00 to 13.50	
Coil springs	17.00 to 17.50	
Axle turn. (elec.)	14.00 to 14.50	
Low phos. punchings.	16.50 to 17.00	
Low phos. plates 12 in. and under	16.00 to 16.50	
Cast iron borings	5.50 to 6.00	
Short shov. turn.	7.25 to 7.75	
Machine shop turn.	7.25 to 7.75	
Rerolling rails	17.50 to 18.00	
Steel rails under 3 ft.	16.00 to 16.50	
Steel rails under 2 ft.	16.50 to 17.00	
Angle bars, steel	15.50 to 16.00	
Cast iron carwheels.	13.00	
Railroad malleable	15.00 to 15.50	
Agric. malleable	11.50 to 12.00	

Per Net Ton		
Iron car axles	19.50 to 20.00	
Steel car axles	19.50 to 20.00	
Locomotive tires	15.50 to 16.00	
Pipes and flues	9.50 to 10.00	
No. 1 machinery cast.	12.50 to 13.00	
Clean auto. cast	12.50 to 13.00	
No. 1 railroad cast.	11.50 to 12.00	
No. 1 agric. cast.	11.00 to 11.50	
Stove plate	8.50 to 9.00	
Grate bars	8.50 to 9.00	
Brake shoes	9.50 to 10.00	

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	\$15.00 to \$15.50
No. 2 hvy. mltng. steel.	14.00 to 14.50
Low phos. plate	16.00 to 16.50
No. 1 busheling	13.50 to 14.00
Hydraulic bundles	14.25 to 14.75
Machine shop turn.	10.00 to 10.50

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	\$14.00 to \$14.50
No. 2 hvy. mltng. steel.	13.50 to 14.00
Comp. sheet steel	14.00 to 14.50
Light bund. stampings	11.00 to 11.50
Drop forge flashings.	13.00 to 13.50
Machine shop turn.	7.00 to 7.50
Short shov. turn.	7.50 to 8.00
No. 1 busheling	13.00 to 13.50
Steel axle turnings.	11.00 to 11.50
Low phos. billet and bloom crops	18.00 to 18.50
Cast iron borings	7.75 to 8.25
Mixed bor. & turn.	7.75 to 8.25
No. 2 busheling	7.75 to 8.25
No. 1 cast	16.50 to 17.00
Railroad grate bars	9.50 to 10.00
Stove plate	10.00 to 10.50
Rails under 3 ft.	19.00 to 19.50
Rails for rolling	17.00 to 17.50
Railroad malleable	15.00 to 15.50
Cast iron carwheels	14.00 to 14.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	\$14.00 to \$14.50
No. 2 hvy. mltng. steel.	12.00 to 12.50
Scrap rails	15.00 to 15.50
New hvy. bndled sheets	12.00 to 12.50
Old hydral. bundles.	10.50 to 11.00
Drop forge flashings.	12.00 to 12.50
No. 1 busheling	12.00 to 12.50
Hvy. axle turnings	10.50 to 11.00
Machine shop turn.	6.75 to 7.25
Knuckles & couplers.	16.50 to 17.00
Coil & leaf springs.	16.50 to 17.00
Rolled steel wheels.	16.00 to 16.50
Low phos. billet crops.	15.50 to 16.00
Shov. turnings	8.75 to 9.25
Mixed bor. & turn.	7.50 to 8.00
Cast iron borings.	7.50 to 8.00
Steel car axles	16.50 to 17.00
No. 1 machinery cast.	15.50 to 16.00
No. 1 cupola cast.	14.50 to 15.00
Stove plate	13.00 to 13.50
Steel rails under 3 ft.	17.50 to 18.00
Cast iron carwheels.	13.50 to 14.00
Railroad malleable	14.50 to 15.00
Chemical borings	9.00 to 9.50

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting.	\$13.25 to \$13.75
No. 1 hvy. melting.	13.25 to 13.75
No. 2 hvy. melting.	12.25 to 12.75
No. 1 locomotive tires.	13.25 to 13.75
Misc. stand. sec. rails.	13.75 to 14.25
Railroad springs	15.00 to 15.50
Bundled sheets	8.00 to 8.50
No. 1 busheling	7.50 to 8.00
Cast. bor. & turn.	4.00 to 4.50
Machine shop turn.	5.00 to 5.50
Heavy turnings	9.00 to 9.50
Rails for rolling	17.00 to 17.50
Steel car axles	18.50 to 19.00
No. 1 RR. wrought.	10.75 to 11.25
No. 2 RR. wrought.	13.25 to 13.75
Steel rails under 3 ft.	15.50 to 16.00
Steel angle bars	14.50 to 15.00
Cast iron carwheels.	14.00 to 14.50
No. 1 machinery cast.	14.50 to 15.00
Railroad malleable	12.50 to 13.00
No. 1 railroad cast.	12.50 to 12.75
Stove plate	9.00 to 9.50
Grate bars	8.50 to 9.00
Brake shoes	10.00 to 10.50

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mltng. steel.	\$11.25 to \$11.75
No. 2 hvy. mltng. steel.	9.00 to 9.75
Scrap rails for mltng.	15.25 to 15.75
Loose sheet clippings.	6.75 to 7.25
Hydral. b'ndled sheets	10.25 to 10.75
Cast iron borings	4.25 to 4.75
Machine shop turn.	5.50 to 6.00
No. 1 busheling	8.00 to 8.50
No. 2 busheling	2.75 to 3.25
Rails for rolling	17.25 to 17.75
No. 1 locomotive tires.	14.00 to 14.50
Short rails	17.75 to 18.25
Cast iron carwheels.	12.50 to 13.00
No. 1 machinery cast.	13.50 to 14.00
No. 1 railroad cast.	13.00 to 13.50
Burnt cast	7.00 to 7.50
Stove plate	7.00 to 7.50
Agricul. malleable	11.50 to 12.00
Railroad malleable	14.00 to 14.50
Mixed hvy. cast	10.50 to 11.00

BIRMINGHAM

Per gross ton delivered to consumer:

Hvy. melting steel.	\$12.50 to \$14.00
Scrap steel rails	14.50 to 15.00
Short shov. turnings.	7.50 to 8.10
Stove plate	9.00 to 10.00
Steel axles	15.00 to 16.00
Iron axles	15.00 to 16.00
No. 1 RR. wrought	10.00
Rails for rolling	16.00 to 16.50
No. 1 cast	14.50
Tramcar wheels	14.00

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	\$10.00 to \$10.50
No. 2 hvy. mltng. steel.	8.50 to 9.00
Borings and turnings.	5.50 to 6.00
Long turnings	5.50 to 6.00
Short shov. turnings.	6.50 to 7.00
No. 1 machinery cast.	12.00 to 12.50
Automotive cast	13.00 to 13.50
Hvy. breakable cast.	3.50 to 4.00
Hydral. comp. sheets.	11.75 to 12.25
Stove plate	8.00 to 8.50
New factory bushel.	10.75 to 11.25
Old No. 2 busheling.	3.00 to 3.50
Sheet clippings	9.00 to 9.50
Flashings	9.00 to 9.50
Low phos. plate scrap	11.75 to 12.25

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel.	\$10.00 to \$10.50
No. 2 hvy. mltng. steel	8.50 to 9.00
Hvy. breakable cast.	11.50 to 12.00
No. 1 machinery cast.	11.50 to 12.00
No. 2 cast	9.50 to 10.00
Stove plate	9.00 to 9.50
Steel car axles	20.00 to 20.50
Shafting	15.00 to 15.50
No. 1 RR. wrought.	11.00 to 11.50
No. 1 wrought long.	9.50 to 10.00
Spec. iron & steel pipe	8.50 to 9.00
Rails for rolling	16.00 to 16.50
Clean steel turnings.	3.50 to 4.00
Cast borings	3.00 to 3.50
No. 1 blast furnace.	3.00 to 3.50
Cast borings (chem.)	9.50 to 10.00
Unprepared yard scrap	5.00 to 5.50
Light iron	3.00 to 3.50
Per gross ton, delivered local foundries:	
No. 1 machn. cast.	\$13.50 to \$14.00
No. 2 cast	10.50 to 11.00

* \$1.50 less for truck loads.

† Northern N. J. prices are \$2 to \$2.50 higher.

BOSTON

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	Nominal
Scrap rails	Nominal
No. 2 steel	Nominal
Breakable cast	10.15
Machine shop turn.	3.38
Mixed bor. & turn.	2.00 to 2.25
Bun. skeleton long.	7.65
Shafting	10.25 to 10.50
Cast bor. chemical.	5.50 to 5.75

Per gross ton delivered consumers' yards:

Textile cast	\$12.50 to \$14.50
No. 1 machine cast.	12.50 to 14.50

PACIFIC COAST

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	\$12.50 to \$14.00
No. 2 hvy. mltng. steel.	11.50 to 13.00

CANADA

Dealers' buying prices at their yards, per gross ton:

Toronto Montreal		
No. 1 hvy. mltng. steel.	\$9.50	\$9.00
No. 2 hvy. mltng. steel.	8.00	7.50
Mixed dealers steel.	7.00	6.50
Scrap pipe	5.50	5.00
Steel turnings	4.50	4.00
Cast borings	3.50	3.00
Machinery cast	15.00	14.00
Dealers cast	13.00	12.00
Stove plate	11.00	10.50

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges		
No. 1 hvy. mltng. steel.	\$11.50	
No. 2 hvy. mltng. steel.	10.00	
No. 2 cast	11.00	
Stove plate	10.00 to 10.50	

Boston on cars at Army Base or Mystic Wharf

No. 1 hvy. mltng. steel.	\$13.25 to \$13.50
No. 2 hvy. mltng. steel.	12.25 to 12.50
Rails (scrap)	13.50

Philadelphia, delivered alongside boats, Port Richmond

No. 1 hvy. mltng. steel.	\$14.00
No. 2 hvy. mltng. steel.	13.00

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are \$2 higher. F.o.b. Duluth, billets only, \$2 higher.

Per Gross Ton

Rerolling\$34.00
Forging quality 40.00

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton

Open-hearth or bessemer\$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Per Lb.

Grooved, universal and sheared1.90c.

Wire Rods

(No. 5 to 9/32 in.)

Per Gross Ton

Pittsburgh, Chicago or Cleveland\$43.00
Worcester, Mass. 45.00
Birmingham 43.00
San Francisco 52.00
Rods over 9/32 in. or 47/64 in., inclusive, \$5 a ton over base.

SOFT STEEL BARS

Base per Lb.

Pittsburgh, Chicago, Gary, Cleveland, Buffalo and Birmingham 2.25c.
Detroit, delivered 2.35c.
Duluth 2.35c.
Philadelphia delivered 2.57c.
New York 2.59c.
On cars dock Gulf ports 2.60c.
On cars dock Pacific ports 2.85c.

RAIL STEEL BARS

(For merchant trade)

Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham 2.10c.
On cars dock Tex. Gulf ports 2.45c.
On cars dock Pacific ports 2.70c.

BILLET STEEL REINFORCING BARS

(Straight lengths as quoted by distributors)

Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Cleveland, Youngstown or Sparrows Pt. 1.90c. to 2.05c.
Detroit, delivered 2.00c. to 2.15c.
On cars dock Tex. Gulf ports 2.25c. to 2.40c.
On cars dock Pacific ports 2.50c.

RAIL STEEL REINFORCING BARS

(Straight lengths as quoted by distributors)

Pittsburgh, Chicago, Gary, Buffalo, Cleveland, Youngstown or Birmingham 1.75c. to 1.90c.
Detroit, delivered 1.85c. to 2.00c.
On cars dock Tex. Gulf ports 2.10c. to 2.25c.
On cars dock Pacific ports 2.35c.
Prices on reinforcing bars have been subject to concessions of \$3 a ton or more from above quotations.

IRON BARS

Chicago and Terre Haute 2.15c.
Pittsburgh (refined) 3.60c.

COLD FINISHED BARS AND SHAFTING*

Base per Lb.

Pittsburgh, Buffalo, Cleveland, Chicago and Gary 2.70c.
Detroit 2.75c.

* In quantities of 10,000 to 19,999 lb.

PLATES

Base per Lb.

Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Philadelphia, del'd 2.15c.
New York, del'd 2.29c.
On cars dock Gulf ports 2.45c.
On cars dock Pacific ports 2.60c.
Wrought iron plates, Pt'g. 3.80c.

FLOOR PLATES

Pittsburgh or Chicago 3.35c.
New York, del'd 3.71c.
On cars dock Gulf ports 3.70c.
On cars dock Pacific ports 3.95c.

STRUCTURAL SHAPES

Base per Lb.

Pittsburgh, Chicago, Gary, Buffalo, Bethlehem or Birmingham 2.10c.
Philadelphia, del'd 2.215c.
New York, del'd 2.27c.
On cars dock Gulf ports 2.45c.
On cars dock Pacific ports 2.70c.

STEEL SHEET PILING

Base per Lb.

Pittsburgh, Chicago or Buffalo 2.40c.
On cars dock Gulf ports 2.85c.
On cars dock Pacific ports 2.90c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton\$40.00
Angle bars, per 100 lb. 2.70

F.o.b. Basing Points

Light rails (from billets) per gross ton\$40.00
Light rails (from rail steel) per gross ton 39.00

Base per Lb.

Cut spikes 3.00c.
Screw spikes 4.55c.
Tie plates, steel 2.15c.
Tie plates, Pacific Coast ports 2.25c.
Track bolts, to steam railroads 4.15c.
Track bolts to jobbers, all sizes (per 100 counts) 65-5

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minneapolis, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS*

PRICES F.O.B. UNLESS OTHERWISE NOTED

Hot Rolled

Base per Lb.

Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown or Chicago 2.15c.
Detroit, delivered 2.25c.
Philadelphia, delivered 2.32c.
Granite City 2.25c.
On cars dock Pacific ports 2.65c.
Wrought iron, Pittsburgh 4.25c.

Cold Rolled*

Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown or Chicago 3.20c.
Detroit, delivered 3.30c.
Granite City 3.30c.
Philadelphia, delivered 3.52c.
On cars dock Pacific ports 3.80c.

* Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base.

Galvanized Sheets, 24 Gage

Pittsburgh, Chicago, Gary, Sparrows Point, Buffalo, Middletown, Youngstown or Birmingham 3.50c.
Philadelphia, del'd 3.67c.
Granite City 3.60c.
On cars dock Pacific ports 4.00c.
Wrought iron Pittsburgh 6.10c.

Electrical Sheets

(F.o.b. Pittsburgh)

Base per Lb.

Field grade 3.20c.
Armature 3.55c.
Electrical 4.05c.
Special Motor 4.95c.
Special Dynamo 5.65c.
Transformer 6.15c.
Transformer Special 7.15c.
Transformer Extra Special 7.65c.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

Long Ternes

No. 24 unassorted 8-lb. coating f.o.b. Pittsburgh or Gary 3.95c.
F.o.b. cars dock Pacific ports 4.65c.

Vitreous Enameling Stock, 20 Gage*

Pittsburgh, Chicago, Gary, Youngstown, Middletown or Cleveland 3.35c.
Detroit, del'd 3.45c.
Granite City 3.45c.
On cars dock Pacific ports 3.95c.

TIN MILL PRODUCTS

Black Plate

Pittsburgh, Chicago and Gary 3.15c.
Granite City 3.25c.
On cars dock Pacific ports, boxed 4.10c.

NOTE: No. 29 gage is heaviest in which tin mill black plate is sold. No. 28 and heavier taking sheet base. There are no gages which take the above base prices as extras are applicable in all cases.

*Tin Plate

Per Base Box

Standard cokes, Pittsburgh, Chicago and Gary\$5.00
Standard cokes, Granite City... 5.10

* Prices effective Nov. 10 on shipments through first quarter of 1939.

Special Coated Manufacturing Ternes

Per Base Box

Granite City 4.40
Pittsburgh or Gary\$4.30

Roofing Terne Plate

(F.o.b. Pittsburgh)

(Per Package, 112 sheets, 20 x 28 in.)
8-lb. coating I.C.\$12.00
15-lb. coating I.C. 14.00
20-lb. coating I.C. 15.00
25-lb. coating I.C. 16.00
30-lb. coating I.C. 17.25
40-lb. coating I.C. 19.50

HOT ROLLED STRIP

Prices F.o.b. Unless Otherwise Noted

(Widths up to 12 in.)

Base per Lb.

Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown or Birmingham 2.15c.
Detroit, delivered 2.25c.

Cooperage Stock

Pittsburgh & Chicago 2.25c.

COLD ROLLED STRIP**

Base per Lb.

Pittsburgh, Youngstown or Cleveland 2.95c.
Chicago 3.05c.
Detroit, delivered 3.05c.
Worcester 3.15c.

* Carbon 0.25 and less.

Commodity Cold Rolled Strip

Pittsburgh, Youngstown, or Cleveland 3.10c.
Detroit, delivered 3.20c.
Worcester 3.50c.

COLD ROLLED SPRING STEEL

Pittsburgh and Cleveland Worcester

Carbon 0.26-0.50% 2.95c. 3.15c.
Carbon .51-.75 4.30c. 4.50c.
Carbon .76-1.00 6.15c. 6.35c.
Carbon 1.01 to 1.25 8.35c. 8.55c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh, Chicago, Cleveland and Birmingham)

To Manufacturing Trade

	Per Lb.
Bright wire	2.60c.
Galvanized wire, base	2.65c.*
Spring wire	3.20c.

* On galvanizing wire to manufacturing trade, size and galvanizing extras are charged, the price Nos. 6 to 9 gage, inclusive, thus being 3.15c.

To the Trade

	Base per Keg
Standard wire nails	\$2.45
Coated nails	2.45
Cut nails, carloads	3.60

Base per 100 Lb.

Annealed fence wire	\$2.95
Galvanized fence wire	3.35
Polished staples	3.15
Galvanized staples	3.40
Barbed wire, galvanized	3.20
Twisted barless wire	3.20
Woven wire fence, base column. 67	
Single loop bale ties, base col. 56	

Note: Birmingham base same on above items, except spring wire.

Add \$4 a ton for Mobile, Ala.; \$5 for New Orleans; \$6 for Lake Charles to above bases, except on galvanized and annealed merchant fence wire, which are \$1 a ton additional in each case.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills
F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel	Black Galv.	Wrought Iron	Black Galv.
1 1/2	56	36	1/2 & 3/4 + 9 + 30
1 1/2 to 1 3/4	59	43 1/2	1/2
1 3/4	63 1/2	54	3/4
1 3/4 to 2	66 1/2	58	1 & 1 1/4
2	68 1/2	60 1/2	1 1/2
2 to 2 1/2	71 1/2	63 1/2	2

Lap Weld

2 1/2	61	52 1/2	2 1/2
2 1/2 to 3	64	55 1/2	2 1/2 to 3 1/2
3	66	57 1/2	3 1/2
3 to 3 1/2	68	59 1/2	3 1/2 to 4
3 1/2	70	61 1/2	4
3 1/2 to 4	72	63 1/2	4 1/2 to 5
4	74	65 1/2	5
4 to 4 1/2	76	67 1/2	5 1/2 to 6
4 1/2	78	69 1/2	6
4 1/2 to 5	80	71 1/2	6 1/2 to 7
5	82	73 1/2	7
5 to 5 1/2	84	75 1/2	7 1/2 to 8
5 1/2	86	77 1/2	8
5 1/2 to 6	88	79 1/2	8 1/2 to 9
6	90	81 1/2	9
6 to 6 1/2	92	83 1/2	9 1/2 to 10
6 1/2	94	85 1/2	10
6 1/2 to 7	96	87 1/2	10 1/2 to 11
7	98	89 1/2	11
7 to 7 1/2	100	91 1/2	11 1/2 to 12
7 1/2	102	93 1/2	12
7 1/2 to 8	104	95 1/2	12 1/2 to 13
8	106	97 1/2	13
8 to 8 1/2	108	99 1/2	13 1/2 to 14
8 1/2	110	101 1/2	14
8 1/2 to 9	112	103 1/2	14 1/2 to 15
9	114	105 1/2	15
9 to 9 1/2	116	107 1/2	15 1/2 to 16
9 1/2	118	109 1/2	16
9 1/2 to 10	120	111 1/2	16 1/2 to 17
10	122	113 1/2	17
10 to 10 1/2	124	115 1/2	17 1/2 to 18
10 1/2	126	117 1/2	18
10 1/2 to 11	128	119 1/2	18 1/2 to 19
11	130	121 1/2	19
11 to 11 1/2	132	123 1/2	19 1/2 to 20
11 1/2	134	125 1/2	20
11 1/2 to 12	136	127 1/2	20 1/2 to 21
12	138	129 1/2	21
12 to 12 1/2	140	131 1/2	21 1/2 to 22
12 1/2	142	133 1/2	22
12 1/2 to 13	144	135 1/2	22 1/2 to 23
13	146	137 1/2	23
13 to 13 1/2	148	139 1/2	23 1/2 to 24
13 1/2	150	141 1/2	24
13 1/2 to 14	152	143 1/2	24 1/2 to 25
14	154	145 1/2	25
14 to 14 1/2	156	147 1/2	25 1/2 to 26
14 1/2	158	149 1/2	26
14 1/2 to 15	160	151 1/2	26 1/2 to 27
15	162	153 1/2	27
15 to 15 1/2	164	155 1/2	27 1/2 to 28
15 1/2	166	157 1/2	28
15 1/2 to 16	168	159 1/2	28 1/2 to 29
16	170	161 1/2	29
16 to 16 1/2	172	163 1/2	29 1/2 to 30
16 1/2	174	165 1/2	30
16 1/2 to 17	176	167 1/2	30 1/2 to 31
17	178	169 1/2	31
17 to 17 1/2	180	171 1/2	31 1/2 to 32
17 1/2	182	173 1/2	32
17 1/2 to 18	184	175 1/2	32 1/2 to 33
18	186	177 1/2	33
18 to 18 1/2	188	179 1/2	33 1/2 to 34
18 1/2	190	181 1/2	34
18 1/2 to 19	192	183 1/2	34 1/2 to 35
19	194	185 1/2	35
19 to 19 1/2	196	187 1/2	35 1/2 to 36
19 1/2	198	189 1/2	36
19 1/2 to 20	200	191 1/2	36 1/2 to 37
20	202	193 1/2	37
20 to 20 1/2	204	195 1/2	37 1/2 to 38
20 1/2	206	197 1/2	38
20 1/2 to 21	208	199 1/2	38 1/2 to 39
21	210	201 1/2	39
21 to 21 1/2	212	203 1/2	39 1/2 to 40
21 1/2	214	205 1/2	40
21 1/2 to 22	216	207 1/2	40 1/2 to 41
22	218	209 1/2	41
22 to 22 1/2	220	211 1/2	41 1/2 to 42
22 1/2	222	213 1/2	42
22 1/2 to 23	224	215 1/2	42 1/2 to 43
23	226	217 1/2	43
23 to 23 1/2	228	219 1/2	43 1/2 to 44
23 1/2	230	221 1/2	44
23 1/2 to 24	232	223 1/2	44 1/2 to 45
24	234	225 1/2	45
24 to 24 1/2	236	227 1/2	45 1/2 to 46
24 1/2	238	229 1/2	46
24 1/2 to 25	240	231 1/2	46 1/2 to 47
25	242	233 1/2	47
25 to 25 1/2	244	235 1/2	47 1/2 to 48
25 1/2	246	237 1/2	48
25 1/2 to 26	248	239 1/2	48 1/2 to 49
26	250	241 1/2	49
26 to 26 1/2	252	243 1/2	49 1/2 to 50
26 1/2	254	245 1/2	50
26 1/2 to 27	256	247 1/2	50 1/2 to 51
27	258	249 1/2	51
27 to 27 1/2	260	251 1/2	51 1/2 to 52
27 1/2	262	253 1/2	52
27 1/2 to 28	264	255 1/2	52 1/2 to 53
28	266	257 1/2	53
28 to 28 1/2	268	259 1/2	53 1/2 to 54
28 1/2	270	261 1/2	54
28 1/2 to 29	272	263 1/2	54 1/2 to 55
29	274	265 1/2	55
29 to 29 1/2	276	267 1/2	55 1/2 to 56
29 1/2	278	269 1/2	56
29 1/2 to 30	280	271 1/2	56 1/2 to 57
30	282	273 1/2	57
30 to 30 1/2	284	275 1/2	57 1/2 to 58
30 1/2	286	277 1/2	58
30 1/2 to 31	288	279 1/2	58 1/2 to 59
31	290	281 1/2	59
31 to 31 1/2	292	283 1/2	59 1/2 to 60
31 1/2	294	285 1/2	60
31 1/2 to 32	296	287 1/2	60 1/2 to 61
32	298	289 1/2	61
32 to 32 1/2	300	291 1/2	61 1/2 to 62
32 1/2	302	293 1/2	62
32 1/2 to 33	304	295 1/2	62 1/2 to 63
33	306	297 1/2	63
33 to 33 1/2	308	299 1/2	63 1/2 to 64
33 1/2	310	301 1/2	64
33 1/2 to 34	312	303 1/2	64 1/2 to 65
34	314	305 1/2	65
34 to 34 1/2	316	307 1/2	65 1/2 to 66
34 1/2	318	309 1/2	66
34 1/2 to 35	320	311 1/2	66 1/2 to 67
35	322	313 1/2	67
35 to 35 1/2	324	315 1/2	67 1/2 to 68
35 1/2	326	317 1/2	68
35 1/2 to 36	328	319 1/2	68 1/2 to 69
36	330	321 1/2	69
36 to 36 1/2	332	323 1/2	69 1/2 to 70
36 1/2	334	325 1/2	70
36 1/2 to 37	336	327 1/2	70 1/2 to 71
37	338	329 1/2	71
37 to 37 1/2	340	331 1/2	71 1/2 to 72
37 1/2	342	333 1/2	72
37 1/2 to 38	344	335 1/2	72 1/2 to 73
38	346	337 1/2	73
38 to 38 1/2	348	339 1/2	73 1/2 to 74
38 1/2	350	341 1/2	74
38 1/2 to 39	352	343 1/2	74 1/2 to 75
39	354	345 1/2	75
39 to 39 1/2	356	347 1/2	75 1/2 to 76
39 1/2	358	349 1/2	76
39 1/2 to 40	360	351 1/2	76 1/2 to 77
40	362	353 1/2	77
40 to 40 1/2	364	355 1/2	77 1/2 to 78
40 1/2	366	357 1/2	78
40 1/2 to 41	368	359 1/2	78 1/2 to 79
41	370	361 1/2	79
41 to 41 1/2	372	363 1/2	79 1/2 to 80
41 1/2	374	365 1/2	80
41 1/2 to 42	376	367 1/2	80 1/2 to 81
42	378	369 1/2	81
42 to 42 1/2	380	371 1/2	81 1/2 to 82
42 1/2	382	373 1/2	82
42 1/2 to 43	384	375 1/2	82 1/2 to 83
43	386	377 1/2	83
43 to 43 1/2	388	379 1/2	83 1/2 to 84
43 1/2	390	381 1/2	84
43 1/2 to 44	392	383 1/2	84 1/2 to 85
44	394	385 1/2	85
44 to 44 1/2	396	387 1/2	85 1/2 to 86
44 1/2	398	389 1/2	86
44 1/2 to 45	400	391 1/2	86 1/2 to 87
45	402	393 1/2	87
45 to 45 1/2	404	395 1/2	87 1/2 to 88
45 1/2	406	397 1/2	88
45 1/2 to 46	408	399 1/2	88 1/2 to 89
46	410	401 1/2	89
46 to 46 1/2	412	403 1/2	89 1/2 to 90
46 1/2	414	405 1/2	90
46 1/2 to 47	416	407 1/2	90 1/2 to 91
47	418	409 1/2	91
47 to 47 1/2	420	411 1/2	91 1/2 to 92
47 1/2	422	413 1/2	92
47 1/2 to 48	424	415 1/2	92 1/2 to 93
48	426	417 1/2	93
48 to 48 1/2	428	419 1/2	93 1/2 to 94
48 1/2	430	421 1/2	94
48 1/2 to 49	432	423 1/2	94 1/2 to 95
49	434	425 1/2	95
49 to 49 1/2	436	427 1/2	95 1/2 to 96
49 1/2	438	429 1/2	96
49 1/2 to 50	440	431 1/2	96 1/2 to 97
50	442	433 1/2	97
50 to 50 1/2	444	435 1/2	97 1/2 to 98
50 1/2	446	437 1/2	98
50 1/2 to 51	448	439 1/2	98 1/2 to 99
51	450	441 1/2	99
51 to 51 1/2	452	443 1/2	99 1/2 to 100
51 1/2	454	445 1/2	100
51 1/2 to 52	456	447 1/2	100 1/2 to 101
52	458	449 1/2	101
52 to 52 1/2	460	451 1/2	101 1/2 to 102
52 1/2	462	453 1/2	102
52 1/2 to 53	464	455 1/2	102 1/2 to 103
53	466	457 1/2	103
53 to 53 1/2	468	459 1/2	103 1/2 to 104
53 1/2	470	461 1/2	104
53 1/2 to 54	472	463 1/2	104 1/2 to 105
54	474	465 1/2	105
54 to 54 1/2	476	467 1/2	105 1/2 to 106
54 1/2	478	469 1/2	106
54 1/2 to 55	480	471 1/2	106 1/2 to 107
55	482	473 1/2	107
55 to 55 1/2	484	475 1/2	107 1/2 to 108
55 1/2	486	477 1/2	108
55 1/2 to 56	488	479 1/2	108 1/2 to 109
56	490	481 1/2	109
56 to 56 1/2	492	483 1/2	109 1/2 to 110
56 1/2	494	485 1/2	110
56 1/2 to 57	496	487 1/2	110 1/2 to 111
57	498	489 1/2	111
57 to 57 1/2	500	491 1/2	111 1/2 to 112
57 1/2	502	493 1/2	112
57 1/2 to 58	504	495 1/2	112 1/2

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	\$22.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	\$22.00
Delivered Brooklyn	24.50
Delivered Newark or Jersey City	23.53
Delivered Philadelphia	22.84
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown	21.00
F.o.b. Buffalo	21.00
F.o.b. Detroit	21.00
Southern, delivered Cincinnati	21.06
Northern, delivered, Cincinnati	21.44
F.o.b. Duluth	21.50
F.o.b. Provo, Utah	19.00
Delivered, San Francisco, Los Angeles or Seattle	24.50
F.o.b. Birmingham*	17.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 0.70 per cent and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same, except at Birmingham and Provo, which are not malleable iron basing points.

Basic

F.o.b. Everett, Mass.	\$22.25
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	21.50
F.o.b. Buffalo	20.00
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown	20.50
Delivered Philadelphia	22.34
Delivered Canton, Ohio	21.89
Delivered Mansfield, Ohio	22.44
F.o.b. Birmingham	16.00

Bessemer

F.o.b. Buffalo	\$22.00
F.o.b. Everett, Mass.	23.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	23.00
Delivered Newark or Jersey City	24.53
Erie, Pa., and Duluth	22.00
F.o.b. Neville Island, Toledo, Chicago and Youngstown	21.50
F.o.b. Birmingham	22.00
Delivered Cincinnati	22.11
Delivered Canton, Ohio	22.89
Delivered Mansfield, Ohio	23.44

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.	\$26.50
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Gray Forge

Valley or Pittsburgh furnace	\$20.50
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Charcoal

Lake Superior furnace	\$25.00
Delivered Chicago	25.34

Canadian Pig Iron

Per Gross Ton

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	\$26.50
No. 2 fdy., sil. 1.75 to 2.25	25.50
Malleable	26.00
Basic	25.50

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	\$27.50
No. 2 fdy., sil. 1.75 to 2.25	27.00
Malleable	27.50
Basic	27.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload).....\$92.50

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....\$28.00

Domestic, 26 to 28%.....33.00

Electric Ferrosilicon

Per Gross Ton Delivered; Lump Size

50% (carload lots, bulk)	\$69.50*
50% (ton lots in 50 gal. bbl.)	80.50*
75% (carload lots, bulk)	126.00*
75% (ton lots in 50 gal. bbl.)	139.00*

Bessemer Ferrosilicon

F.o.b. Furnace, Jackson, Ohio

Per Gross Ton

10.00 to 10.50%.....\$30.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2%, 1 per ton additional. Phosphorus 0.75% or over, \$1 per ton additional.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 5.00 to 5.50%.....\$24.50

For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Ferrosilicon

Per Lb. Contained Cr., Delivered Carlots, Lump Size, on Contract

4 to 6% carbon	10.50c.*
2% carbon	16.50c.*
1% carbon	17.50c.*
0.10% carbon	19.50c.*
0.06% carbon	20.00c.*

Silico-manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon	\$92.75
2.50% carbon	97.75
2% carbon	102.75
1% carbon	112.75

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads, nominally.....\$2.00

Ferrotungsten, lots of 500 lbs. nominally.....2.05

Ferrotungsten, smaller lots, nominally.....2.10

Ferrovanadium, contract per lb. contained V., delivered.....\$2.70 to \$2.90†

Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y., tons lots.....\$2.25†

Ferrocobalt, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton.....\$142.50

Ferrocobalt, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton.....\$157.50

Ferrophosphorus, electric or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton.....\$58.50

Ferrophosphorus, electrolytic, 23-26% in car lots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton, \$3 unitage, freight equalized with Nashville.....\$75.00

Ferromolybdenum, per lb. Mo. f.o.b. furnace.....95c.

Calcium molybdate, per lb. Mo. f.o.b. furnace.....80c.

*Spot prices are \$5 per ton higher

†Spot prices are 10c. per lb. of contained element higher.

ORES

Lake Superior Ores

Delivered Lower Lake Ports Per Gross Ton

Old range, Bessemer, 51.50%.....	\$5.25
Old range, non-Bessemer, 51.50%.....	5.10
Messabi, Bessemer, 51.50%.....	5.10
Messabi, non-Bessemer, 51.50%.....	4.95
High phosphorus, 51.50%.....	4.85

Foreign Ore

C.i.f. Philadelphia or Baltimore Per Unit

Iron, low phos., copper free, 55 to 58% dry, Algeria.....	13c.
Iron, low phos., Swedish, average, 68½% iron.....	15c.
Iron, basic or foundry, Swedish, aver. 65% iron.....	13c.
Iron, basic or foundry, Russian, aver. 65% iron.....	Nominal
Man., Caucasian, washed 52%.....	35c.
Man., African, Indian, 44-48%.....	33c.
Man., African, Indian, 49-51%.....	35c.
Man., Brazilian, 46 to 48½%.....	33c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered.....	\$20.00
Tungsten, domestic, scheelite delivered.....	\$19.00 to \$20.00
Chrome ore (lump) c.i.f. Atlantic Seaboard, per gross ton: South African (low grade).....	15.00
Rhodesian, 45%.....	19.50
Rhodesian, 48%.....	23.00
Turkish, 48-49%.....	23.00 to 24.00
Turkish, 45-46%.....	19.00 to 20.00
Turkish, 40-44%.....	17.00 to 18.00
Chrome concentrates (Turkish) c.i.f. Atlantic Seaboard, per gross ton: 50%.....	26.00 to 27.00
48-49%.....	23.25 to 24.25

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail.....	\$17.00 to \$18.00
Domestic, f.o.b. Ohio River landing barges.....	18.00
No. 2 lump, 85-5, f.o.b. Kentucky and Ill. mines.....	18.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid.....	24.50
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines.....	31.50

FUEL OIL

Per Gal.

No. 2 or diesel, f.o.b. Bayonne.....	4.125c.
No. 6, f.o.b. Bayonne.....	2.26c.
Del'd Chicago, No. 5 Bur. Stds.....	3.25c.
Del'd Chicago, No. 6 Bur. Stds.....	2.75c.
Del'd Cleve'd, No. 3 distillate.....	5.50c.
Del'd Cleve'd, No. 4 industrial.....	5.25c.
Del'd Cleve'd, No. 5 industrial.....	3.00c.
Del'd Cleve'd, No. 6 industrial.....	2.75c.

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, Prompt.....	\$3.75
Foundry, f.o.b. Connellsville, Prompt.....	\$4.75 to 5.50
Foundry, by-product, Chicago ovens.....	10.25
Foundry, by-product, del'd New England.....	12.50
Foundry, by-product, del'd Newark or Jersey City.....	10.88 to 11.40
Foundry, by-product, Philadelphia.....	10.95
Foundry, by-product, delivered Cleveland.....	10.30
Foundry, by-product, delivered Cincinnati.....	9.75
Foundry, Birmingham.....	7.50
Foundry, by-product, del'd St. Louis industrial district.....	10.75 to 11.00
Foundry, from Birmingham, f.o.b. cars dock, Pacific ports.....	14.75

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH

	Base per Lb.
Plates	3.55c.
Shapes	3.55c.
Soft steel bars and small shapes	3.60c.
*Reinforcing steel bars	2.70c.
Cold finished bars and screw stock	3.95c.
Hot rolled strip	3.75c.
Hot rolled sheets	3.50c.
Galv. sheets (24 ga.) 500 lb. to 1499 lb.	4.50c.
Wire, black, soft annealed	3.15c.
Wire, galv., soft	3.55c.
Track spikes (1 to 24 kegs)	3.75c.
Wire nails (in 100-lb. kegs)	2.65c.

On plates, structurals, bars, strip and hot rolled sheets, base applied to orders of 400 to 1999 lb.
 ** On reinforcing bars base applies to orders of less than one ton and includes switching and carting charge.
 All above prices for delivery within the Pittsburgh switching district.

NEW YORK

	Base per Lb.
Plates, 1/4 in. and heavier	3.83c.
Structural shapes	3.75c.
Soft steel bars, round	3.94c.
Iron bars, Swed. charcoal	7.50 to 8.25c.
Cold-fin. shafting and screw stock:	
Rounds, squares, hexagons	4.39c.
Flats up to 12 in. wide	4.39c.
Cold-rolled strip, soft and quarter hard	3.66c.
Hot-rolled strip, soft O.H.	4.11c.
Hot-rolled sheets (10 ga.)	3.73c.
Galv. sheets (24 ga.)	4.60 to 4.85c.
Long ternes (24 ga.)	5.50 to 6.20c.
Cold-rolled sheets (20 ga.)	
Standard quality	4.90c.
Deep drawing	5.15c.
Stretchers leveled	5.50c.
SAE, 2300, hot-rolled	7.50c.
SAE, 3100, hot-rolled	6.10c.
SAE, 6100, hot-rolled annealed	10.25c.
SAE, 2300, cold-rolled	8.69c.
SAE, 3100, cold-rolled, annealed	7.29c.
Floor plate, 1/4 in. and heavier	5.43c.
Standard tool steel	12.50c.
Wire, black, annealed (No. 9)	4.65c.
Wire, galv. (No. 9)	5.00c.
Open-hearth spring steel	4.75c. to 10.25c.
Common wire nails, per keg in 25 keg lots	\$3.25

CHICAGO

	Base per Lb.
Plates and structural shapes	3.55c.
Soft steel bars, rounds and angles	3.60c.
Soft steel squares, hexagons, channels and Tees	3.75c.
Hot rolled strip	3.75c.
Floor plates	5.15c.
Hot rolled sheets	3.50c.
Galvanized sheets	4.50c.
Cold rolled sheets	4.45c.
Cold finished carbon bars	4.05c.

Above prices are subject to deductions and extras for quantity and are f.o.b. consumer's plant within Chicago free delivery zone.

CLEVELAND

	Base per Lb.
Plates	3.55c.
Structural shapes	3.73c.
Soft steel bars	3.50c.
Reinfor. bars (under 2000 lb.)†	2.55c.
Cold-fin. bars (1000 lb., over)	4.05c.
Hot-rolled strip	3.65c.
Cold rolled sheets	4.70c.
Cold-finished sheet	3.35c.
Galvanized sheets (No. 24)	4.62c.
Hot-rolled sheets	3.50c.
Floor plates, 3/16 in. and heavier	5.23c.
*Black ann'd wire, per 100 lb.	\$3.10
*No. 9 galv. wire, per 100 lb.	3.50
*Com. wire nails, base per keg	2.60
Hot rolled alloy steel (3100)	6.05c.
Cold rolled alloy steel (3115)	6.85c.

* For 5000 lb. or less
 † 500 lb., base quantity.

Prices shown on hot rolled bars, strip, sheets, shapes and plates are for 400 to 1999 lb. Alloy steel, 1000 lb. and over; galvanized sheets, 150 to 1499 lb.; cold rolled sheets, 399 lb. and under.

ST. LOUIS

	Base per Lb.
Plates and structural shapes	3.82c.
Bars, soft steel (rounds and flats)	3.87c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	4.02c.
Cold fin. rounds, shafting, screw stock	4.32c.
Galv. sheets (24 ga.)	4.77c.
Hot rolled sheets	3.77c.
Galv. corrugated sheets, 24 ga. and heavier*	4.82c.
Structural rivets	5.02c.

* No. 26 and lighter take special prices.

BOSTON

	Base per Lb.
Structural shapes, 3 in. and larger	5.85c.
Plates, 1/4 in. and heavier	3.85c.
Bars	3.98c.
Heavy hot rolled sheets	3.86c.
Hot rolled sheets	4.21c.
Hot rolled annealed sheets	4.76c.
Galvanized sheets	4.76c.
Cold rolled sheets	4.93c.

The following quantity differentials apply: Less than 100 lb., plus \$1.50 per 100 lb.; 100 to 399 lb. plus 50c.; 400 to 1999 lb. base; 2000 to 9999 lb. minus 20c.; 10,000 to 39,999 lb. minus 30c.; 40,000 lb. and over minus 40c.

BUFFALO

	Base per Lb.
Plates	3.77c.
Floor plates	5.40c.
Struc. shapes	3.55c.
Soft steel bars	3.60c.
Reinforcing bars (20,000 lb. or more)	2.05c.
Cold-fin. flats, squares, rounds, and hex.	4.05c.
Hot-rolled sheets, 3/16 x 14 in. to 48 in. wide incl. also sizes No. 8 to 30 ga.	3.50c.
Galv. sheets (24 ga.)	4.50c.
Bands and hoops	3.97c.

NEW ORLEANS

	Base per Lb.
Mild steel bars	4.20c.
Reinforcing bars	3.24c.
Structural shapes	4.10c.
Plates	4.10c.
Hot-rolled sheets, No. 10	4.35c.
Steel bands	4.75c.
Cold-finished steel bars	5.10c.
Structural rivets	4.85c.
Boiler rivets	4.85c.
Common wire nails, base per keg	3.55
Bolts and nuts, per cent off list	60

REFRATORIES PRICES

Fire Clay Brick	
Per 1000 f.o.b. Works	
Super-duty brick, at St. Louis	\$60.80
First quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois	47.50
First quality, New Jersey	52.50
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	42.75
Second quality, New Jersey	49.00
No. 1, Ohio	39.90
Ground fire clay, per ton	7.10
Silica Brick	
Per 1000 f.o.b. Works	
Pennsylvania	\$47.50
Chicago District	56.05
Birmingham	47.50
Silica cement per net ton (Eastern)	8.55
Chrome Brick	
Per Net Ton	
Standard f.o.b. Baltimore, Plymouth Meeting and Chester	\$47.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	47.00
Magnesite Brick	
Per Net Ton	
Standard f.o.b. Baltimore and Chester	\$67.00
Chemically bonded, f.o.b. Baltimore	57.00
Grain Magnesite	
Per Net Ton	
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	\$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks	40.00
Domestic, f.o.b. Chewelah Wash. (in bulk)	22.00

PHILADELPHIA

	Base per Lb.
*Plates, 1/4-in. and heavier	3.40c.
*Structural shapes	3.40c.
*Soft steel bars, small shapes, iron bars (except bands)	3.60c.
†Reinforc. steel bars, square and deformed	2.61c.
Cold-finished steel bars	4.36c.
*Steel hoops	4.10c.
*Steel bands, No. 12 and 3/16 in. incl.	3.60c.
*Spring steel	4.75c.
†Hot-rolled anneal. sheets	3.40c.
†Galvanized sheets (No. 24)	4.56c.
*Diam. pat. floor plates, 1/4 in.	5.00c.

These prices are for delivery in Philadelphia trucking area.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.
 †For 25 bundles or over.
 ‡For one to five tons.

BIRMINGHAM

Bars and bar shapes	\$3.85 base	
Structural shapes and plates	3.75 "	
Hot rolled sheets No. 10 ga.	3.80 "	
Hot rolled sheets No. 24 ga.	4.40 "	3500 lb. and over
Galvanized sheets No. 24 ga.	5.05 "	3500 lb. or more
Strip	4.05 "	
Reinforcing bars	3.85 "	
Floor plates	5.96 "	
Cold finished bars	4.91 "	
Machine and carriage bolts	50 & 10 off list	
Rivets (structural)	\$4.60 base	
On plates, shapes, bars, hot-rolled strip heavy hot-rolled sheets, the base applies on 400 to 3999 lb. All prices are f.o.b. consumer's plant.		

PACIFIC COAST

	San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	3.85c.	4.00c.	4.05c.
Shapes, standard	3.95c.	4.00c.	4.05c.
Soft steel bars	4.05c.	4.00c.	4.30c.
Reinforcing bars, f.o.b. cars dock			
Pacific ports	2.675c.	open.	2.975c.
Hot-rolled sheets (No. 10)	4.00c.	4.20c.	4.20c.
Galv. sheets (No. 24 and lighter)	5.15c.	5.05c.	5.50c.
Galv. sheets (No. 22 and heavier)	5.40c.	5.05c.	5.50c.
Cold-finished steel			
Rounds	6.55c.	6.60c.	7.10c.
Squares and hexagons	7.80c.	7.85c.	7.10c.
Flats	8.30c.	8.35c.	8.10c.
Common wire nails—base per keg less carload	\$3.20	\$3.05	\$3.00
All items subject to differentials for quantity.			

ST. PAUL

	Base per Lb.
Mild steel bars, rounds	4.10c.
Structural shapes	4.00c.
Plates	4.00c.
Cold-finished bars	4.83c.
Hot-rolled annealed sheets, No. 24	4.75c.
Galvanized sheets, No. 24	5.00c.

On mild steel bars, shapes and plates the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1099 lb. and over of a size.

PLANT EXPANSION AND EQUIPMENT BUYING

◀ NORTH ATLANTIC ▶

Continental Oil Co., 60 East Forty-second Street, New York, has approved plans for expansion and improvements in gasoline oil refinery at Ponca City, Okla., including new cracking unit, enlargements and improvements in pumping plant, electrical and steam systems; also increase in steel tank storage and distributing facilities. Cost close to \$1,500,000 with machinery. An award for certain equipment has been made to M. W. Kellogg Co., 225 Broadway, New York, and contracts for other work will be let soon.

Commanding Officer, Watervliet Arsenal, Watervliet, N. Y., asks bids until Nov. 29 for furnishing and installing automatic stokers and auxiliary equipment in power house (Circular 68).

American Viscose Corp., 200 Madison Avenue, New York, cellulose rayon products, has begun work on new mill unit at Nitro, W. Va., for processing of rayon staple fiber, doubling present plant output. Cost about \$5,000,000 with machinery.

Board of Education, Central School District, Hyde Park, N. Y., plans manual training equipment in new three-story high school. Cost over \$600,000. Financing has been arranged through Federal aid. R. E. Sluyter, 203 North Washington Street, Herkimer, N. Y., is architect.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 29 for 100,000 automatic fasteners for Brooklyn Navy Yard (Schedule 4915).

Aerovox Corp., 70 Washington Street, Brooklyn, manufacturer of condensers and other equipment for automobiles, radios, etc., has leased space in a building at New Bedford, Mass., and plans early removal to that location, where expansion will be carried out.

American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, New York, has arranged for purchase of about 72 acres at Georgetown, S. C., fronting on Sampit River, including group of buildings on part of site. Company will take immediate possession and will modernize existing structures, and erect new units for production of sulphate of alumina and allied specialties. A power house on property also will be improved. Cost over \$400,000 with equipment.

Signal Corps Procurement District, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until Nov. 21 for 650 pipe bends (Circular 93), loop mountings (Circular 94), 525,000 tacks (Circular 92).

Benjamin W. Gammin, New York, has leased space in building at 205 East Twenty-second Street for manufacture of tools and dies.

C. W. Brick Milling Co., Columbus, Burlington County, N. J., plans rebuilding part of grain milling plant recently destroyed by fire. Loss close to \$175,000 with machinery.

Commanding Officer, Ordnance Department, Picatinny Arsenal, near Dover, N. J., asks bids until Nov. 21 for six sensitive drilling machines and four tapping attachments (Circular 338), six 1500-lb. hydraulic presses (Circular 378); until Nov. 22, two motor-driven, high-speed sensitive drill presses (Circular 394), one washing machine (Circular 393); until Nov. 23 for reworking about 30,000 lb. of brass turnings (Circular 343).

Charvos, Inc., care of Samuel Sanders, president, L. Oppleman, Inc., 49 West Twenty-third Street, New York, engineering and optical instruments, recently organized by Mr. Sanders and associates, has purchased a one-story building at 185 Hackensack Street, East Rutherford, N. J., for production of precision instruments of character noted, including parts production and assembling. Andre Charvos, president, Manufacture Francaise de Compas, Ligney-en-Barre, France, manufacturer of similar instruments with plant at last noted place, is interested in new company.

Supply Officer, Naval Aircraft Factory, Navy Yard, Philadelphia, asks bids until Nov. 21 for parts for wheel, brake and axle assemblies for airplanes; adjustable screws, special nuts, tubular rivets, brake adjusting hole covers, etc. (Aero Req. 79), 10 cutting blocks (Aero Req. 3); universal joint yoke assemblies, aluminum-alloy forgings, hinge forgings and other parts for airplanes (Aero Req. 95), 300 engine cowl blocks, fairing assemblies and other parts for airplanes (Aero Req. 121), gaskets and accessories for airplane engines (Aero Req. 502-1040); until Nov. 23, parts for airplanes (Aero Req. 502-1075).

Commanding Officer, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until Nov. 22 for reworking 220,000 lb. gilding metal clippings into gilding metal, reworking 263,000 lb. of scrap into bullet jacket cups, and reworking 180,000 lb. of scrap into gilding metal (Circular 426).

◀ BUFFALO DISTRICT ▶

Harrison Radiator Corp., Washburn Street, Lockport, N. Y., manufacturer of automobile radiators, etc., plans extensions and improvements. Cost close to \$50,000 with equipment. J. Markley, Bewley Building, is architect.

Hope's Windows, Inc., Hopkins Avenue, Jamestown, N. Y., manufacturer of metal window casements and other products, has asked bids for superstructure for one-story addition to plant at East Jamestown, 100 x 400 ft. Cost close to \$100,000 with equipment. Beck & Tinkham, Bailey Building, are architects.

Board of Education, Lockport, N. Y., plans manual training equipment in new three-story combination junior high school on Passaic Avenue, for which bids are being asked on general contract until Nov. 28. Cost about \$525,000. Carl Schmill & Sons, Prudential Building, Buffalo, are architects.

◀ WASHINGTON DIST. ▶

Quartermaster, Third Corps Area, Post Office Building, Baltimore, asks bids until Nov. 21 for one 300 to 400-gal. power sprayer, with gasoline engine; one pneumatic-tired tractor (Circular 53-13).

John Deere Plow Co., 211 West Pratt Street, Baltimore, agricultural implements, with main plant at Moline, Ill., has let general contract to W. E. Bickerton Construction Co., 515 Cathedral Street, for three-story factory branch, storage and distributing plant at Exeter Hall and Kirk Avenues, Baltimore. Cost over \$100,000 with equipment.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Nov. 23 for three turbo-alternators and auxiliary equipment for power plant at Pearl Harbor Navy Yard (Specifications 9027); until Nov. 30, eight 40-ton and five 30-ton locomotive cranes, standard gauge, 8-wheel type, operated by gasoline or diesel engines, for Norfolk, Philadelphia, Brooklyn, Mare Island, Boston, Portsmouth, Charleston, and Puget Sound Navy yards (Specifications 8982).

General Purchasing Officer, Panama Canal, Washington, asks bids until Nov. 28 for 160,000 ft. of rigid steel conduit, 10,500 ft. of wire rope, 1000 lb. of iron or steel galvanized sizing strand, 7849 ft. of cable, three garage cranes, 65,000 railway tie plates, 12 units of steel revolving bins, 2400 bin subdividers, conduit elbows, pipe bends, two trench pumps, one sewage sump pumping unit, 36 steel snatch blocks, 78 tackle blocks, 41,000 lb. steel wire nails, 5000 lb. steel wire finishing nails, 5000 lb. galvanized steel wire finishing nails, 5000 lb. galvanized iron or steel flooring

nails, distribution type electric transformers and other equipment (Schedule 3397).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 22 for one motor-driven sheet metal flanging machine (Schedule 4867); until Nov. 25, motor-driven generator, 12-in. straight bevel gear, self-contained (Schedule 4878) for Portsmouth, N. H., Navy Yard; steel sockets for taper shank tools (Schedule 4855), 200 1-gal. gasoline fire pots (Schedule 4851), screw drivers (Schedule 4861), ship scrapers (Schedule 4852), band saws, compass saws, crosscut and keyhole saws, etc. (Schedule 4858).

◀ NEW ENGLAND ▶

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until Nov. 22 for three bench precision lathes (Circular 154); until Nov. 28, one automatic drilling, reaming and centering machine, one automatic drilling, reaming, tapping and milling machine, and one multiple spindle drilling, reaming and tapping machine (Circular 116); until Nov. 30, three motor-driven turret lathes (Circular 138).

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Nov. 23 for technical school building at naval submarine base, New London, Conn. (Specifications 8810).

Keller-Dorian Paper Co., Stamford, Conn., manufacturer of metal foil papers, has leased about 20,000 sq. ft. of floor space in building at 516 West Thirty-fourth Street, New York, and will remove present factory at Stamford to new location and increase capacity. Main offices of company are at 390 Fourth Avenue, New York.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 25 for five latest model semi-trailers (Schedule 4888) for Charleston Navy Yard.

◀ SOUTH ATLANTIC ▶

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for boilers, boiler settings, mechanical stokers, forced-draft fans, ducts, flues, etc., for power house at Charleston, S. C., Navy Yard (Specifications 8820).

Corbitt Co., Henderson, N. C., manufacturer of automobile bodies, plans rebuilding part of plant recently destroyed by fire. Loss about \$75,000 including equipment.

Quartermaster, Fort Screven, Ga., asks bids for centrifugal pumping unit and auxiliary equipment for building No. 105 (Circular 826-9).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 29 for 18 pneumatic drills (Schedule 4910).

◀ SOUTHWEST ▶

Jackson County Highway Department, Court House, Kansas City, Mo., will take bids soon for additions to equipment shops and storage and distributing buildings at Independence, Mo., including service and garage units. Cost about \$120,000 with equipment. M. Dwight Brown and James D. Marshall, 114 West Tenth Street, Kansas City, are architects and engineers.

Southern Acid & Sulphur Co., Rialto Building, St. Louis, is having plans drawn by Austin Co., Arcade Building, engineer and contractor, for new plant on Wallisville Road, Houston, Tex., consisting of three main production units, each two stories, 90 x 190 ft., 90 x 195 ft., and 90 x 90 ft., with one-story office building. Company will remove present plant from Texarkana, Tex., to new location and increase capacity. Cost close to \$100,000 with equipment.

Hyde Park Breweries Association, Inc., 2110 Salisbury Street, St. Louis, has let general contract to A. H. Haeseler Building & Contracting Co., 2346 Palm Street, for one-story addition, 80 x 103 ft., for storage and distribution. Cost close to \$50,000 with equipment. William A. Roebke, 2110 Salisbury Street, is engineer.

Shore Machine Works, Dodge City, Kan., manufacturer of machinery and parts, plans rebuilding part of plant recently destroyed by fire. Loss close to \$80,000 with equipment.

Mutual Citrus Growers, Inc., Mercedes, Tex., canner and packer, has let general contract to Charles L. Diven, Inc., Weslaco, Tex., for two-story addition to main canning plant. Cost close to \$50,000 with equipment.

◀ WESTERN PA. DIST. ▶

United States Engineer Office, New Post Office Building, Pittsburgh, asks bids until Dec. 7 for four vertical propeller or modified open propeller-type pumping units, each 32,000-gal. per min. capacity, with motors and accessories (Circular 274).

Mifflin Township Board of Education, Homeville, Pa., plans manual training department in new two-story and basement high school, for which general contract has been let to William S. Miller Co., 2565 Fifth Avenue, Pittsburgh. Cost over \$300,000.

Colcord Coal Co., Whitesville, W. Va., plans rebuilding part of coal-mining plant recently destroyed by fire, including tipples, head house and 2800-ft. conveyor unit. Loss over \$100,000.

◀ SOUTH CENTRAL ▶

Magnolia Petroleum Co., Shreveport, La., has let general contract to Pittman Brothers Construction Co., 2800 North Galvez Street, New Orleans, for new bulk oil terminal at Meraux, La., to include main one-story building, 50 x 100 ft., truck-loading dock, pumping station, steel tank storage and distributing facilities and other structures. Cost close to \$65,000 with equipment.

Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until Nov. 21 for steel guides and frames for intake gates at Hiwassee dam, totaling about 50,000 lb. of steel work, including 6000 lb. of stainless steel.

Roanoke Oil Co., Roanoke, Ala., manufacturer of cottonseed oil products, plans rebuilding part of mill recently destroyed by fire. Loss over \$100,000 with equipment.

Board of Aldermen, Scottsboro, Ala., Dayton Benham, city clerk, asks bids until Nov. 22 for new municipal electrical distributing system, including transmission line for connection with power source and operating facilities. Cost about \$100,000. Lide & Adler, Woodward Building, Birmingham, are consulting engineers.

◀ MICHIGAN DISTRICT ▶

City Council, Sturgis, Mich., has engaged Ayres, Lewis, Norris & May, Ann Arbor, Mich., consulting engineers, to prepare plans for extensions and improvements in municipal electric power plant, including new diesel engine-generator unit and auxiliary equipment. Cost about \$274,000. Financing has been arranged through Federal aid.

Board of Education, Saginaw, Mich., plans manual training equipment in new three-story and basement high school, for which bids will be asked soon on general contract. Cost about \$1,400,000. Financing has been arranged through Federal aid. Frantz & Spence, 118 North Washington Street, architects.

Transport Refrigeration Co., 474 Hollister Building, Lansing, Mich., recently organized with capital of \$150,000, plans local works for production of a new refrigeration unit, designed to maintain constant temperatures in insulated motor truck bodies, railroad cars and conveyances. Clark R. Graves, formerly connected with local branch of Consumers Power Co., is president; William G. Roost, 312 Hollister Building, is attorney and representative.

◀ MIDDLE WEST ▶

International Filter Co., 339-47 West Twenty-fifth Street, Chicago, manufacturer of hydraulic control equipment, water purification apparatus, etc., will begin work on superstructure for one-story addition, about 15,000

sq. ft. of floor space. Cost close to \$60,000 with equipment. A. Epstein, 2001 Pershing Road, is architect and engineer.

Signal Corps Procurement District, 1819 West Pershing Road, Chicago, asks bids until Nov. 22 for 18,800 ft. of subterranean and steel tape armored galvanized telephone cable, and 3600 ft. regular telephone cable (Circular 48), 242 manhole tops (Circular 47).

City Council, Mount Pleasant, Iowa, asks bids until Nov. 30 for extensions and improvements in municipal electric power plant, including new 1500-kw. steam turbo-generator unit, with alternate bids on 1250-kw. similar unit (Section 2), surface condenser with auxiliaries (Section 3), feedwater heater of open deaerating type (Section 4), centrifugal feedwater pump with dual drive (Section 5), piping for connection of equipment noted (Section 6), and electric switchgear (Section 7). Young & Stanley, Inc., 211 Iowa Avenue, Muscatine, Iowa, is consulting engineer.

J. H. Stone & Sons, 1851 West Seventy-fourth Street, Chicago, manufacturers of corrugated paper boxes and containers, plans installation of a traveling crane to handle bulk paper shipments at new one-story plant in Central Manufacturing District; also loaders, conveyors and other mechanical-handling equipment. Cost about \$500,000 with equipment. A. Epstein, 2001 West Pershing Road, is architect and engineer.

Kerber Packing Co., 56 South Grove Street, Elgin, Ill., food products, has let general contract to Charles E. Gierz & Son, McBride Building, for two-story addition, 40 x 80 ft., to packing plant. Cost close to \$45,000 with equipment. This is first unit of expansion to be made at plant.

Highway Trailer Co., Edgerton, Wis., manufacturer of freight and passenger trailers, municipal equipment, etc., is about to start work on a factory addition, 160 x 220 ft., one-story, to cost \$50,000 with equipment.

Board of Vocational Education, La Crosse, Wis., has accepted bid of Robert Regan Co., 228 North La Salle Street, Chicago, for addition to vocational school, 141 x 200 ft., two and three stories and basement, costing about \$300,000. John B. Coleman is school director.

Breyer Bros., Whiting & Co., Waupun, Wis., manufacturers of metal and wooden tanks, have placed general contract with Moore Bros., local, for construction of factory addition, 71 x 40 ft., part two stories and basement.

Board of Education, Madison, Wis., closed bids Nov. 14 for addition to manual arts department of East High School, 42 x 165 ft., two stories and basement, costing about \$75,000, and PWA project. M. E. Johnson, 22 West Dayton Street, is superintendent.

Metropolitan Sewerage District, 110 East Main Street, Madison, Wis., closes bids Nov. 25 for improvements to sewage treatment plant, including a 6750 c. f. m. blower unit with sludge gas engine drive, and 200-hp. motor with coupling for driving a 4500 c. f. m. blower. H. O. Lord is chief engineer.

◀ OHIO AND INDIANA ▶

Brewing Corp. of America, Inc., Quincy Avenue and East Ninety-third Street, Cleveland, has asked bids on general contract for three-story and basement addition, 50 x 250 ft., for storage and distribution, with part of structure for service, repair and garage department for company cars and trucks. Cost close to \$160,000 with equipment. Ernest McGeorge, 9400 Quincy Avenue, is engineer.

District Quartermaster, CCC, Fort Hayes, Columbus, Ohio, asks bids until Nov. 22 for galvanized pipe hangers, galvanized unions, galvanized malleable iron pipe fittings, compression couplings, valves, boiler couplings and bushings, etc. (Circular 5502-30).

Contracting Officer, Materiel Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until Nov. 21 for bolt and wire cutters, four machinery testing levels and three machine vises (Circular 342), two motor-driven contour metal-sawing, filing and polishing machines (Circular 344), one crucible melting furnace, tilting-type, natural gas-fired (Circular 343).

Cummins Engine Co., Columbus, Ind., manufacturer of diesel engines and parts, has let

general contract to Austin Co., Cleveland, for one-story addition, 80 x 200 ft., for expansion in assembling division. Cost close to \$100,000 with equipment.

District Quartermaster, CCC, Fort Benjamin Harrison, Ind., asks bids until Nov. 21 for 10 10-in. ball bearing hand saws, six 10-in. circular saws, nine 11-in. lathes, and 11 bench-type drill presses, all for woodworking and all motor-driven (Circular 5501-22).

◀ PACIFIC COAST ▶

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for one diesel engine-driven generator set, with 60-hp. engine unit and 40-kw. generator, and auxiliary equipment, for naval operating base, San Diego, Cal. (Specifications 8963).

Food Machinery Corp., Twelfth Street and Pachappa Avenue, Riverside, Cal., manufacturer of machinery for packing and canning plants, etc., has let general contract to Cresmer & Emtman, 3224 Eighth Street, for one-story addition, including improvements in present plant. Cost about \$40,000 with equipment.

Edmonds School District 15, Snohomish, Wash., plans one-story vocational shop in connection with additions to high school at Edmonds, for which bids have been asked on general contract. Cost about \$190,000. William Mallis, Lyon Building, Seattle, is architect.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 22 for one engine lathe (Schedule 4826) for San Pedro, Los Angeles, Naval Station; two milling machines (Schedules 4829 and 4830), horizontal boring, drilling, milling and draw-out traveling head planer (Schedule 4832), all motor-driven, for Mare Island Navy Yard.

Pioneer-Flintkote Co., 5500 South Alameda Street, Vernon, Los Angeles, manufacturer of prepared roofing, heavy building papers, etc., has let general contract to Austin Co. of California, Inc., Los Angeles, for one-story addition, 270 x 350 ft., at 2051 East Fifty-fifth Street, part of unit to be used for storage and distribution, and remainder for general production. Cost close to \$175,000 with equipment.

Berkeley Unified School District, 2325 Milvia Street, Berkeley, Cal., has let general contract to H. J. Christensen Co., and W. E. Lyons Construction Co., 1955 Webster Street, Oakland, Cal., for two-story vocational shop at high school on Bancroft Way. Cost about \$200,000 with equipment. W. G. Corlett and Henry W. Guttererson, Bank of America Building, Oakland, are architects.

Constructing Quartermaster, Fort Huachuca, Ariz., asks bids until Nov. 21 for galvanized wrought iron pipe, brass pipe, malleable iron pipe fittings, brass pipe fittings, unions, gate valves, globe valves, flanges and other equipment (Circular 6203-46).

◀ FOREIGN ▶

A. V. Roe & Co., Ltd., Newton Heath, Manchester, England, manufacturer of airplanes and parts, has approved plans for new works on large tract at Greengate, Chadderton, Lancashire, for parts production and assembling of several new types of aircraft. Cost close to \$5,000,000 with equipment, which will provide for employment of about 5000 persons.

State Electricity Commissioners, Melbourne, Victoria, Australia, will receive bids until March 14, 1939, for new steam generating plant, including watertube boilers, coal and ash-handling plants, steel stacks, steam piping and other installation (Specifications 38-39/33).

Roselle Tool & Die Co., 110 Westfield Avenue, Roselle Park, N. J., manufacturer of tools, dies, jigs, fixtures and special machinery, is moving into a new plant it recently erected on West Clay Avenue. J. Schicho is president.

THIS WEEK'S MACHINE ... TOOL ACTIVITIES ...

... Much better feeling expressed by machine tool users presages larger business ahead for builders, although currently orders are off in some centers . . . Small tool and cutter sales jump.

Considerable Improvement in Sales in Mid-West

CHICAGO — Comparatively speaking, business has improved considerably here in the past few weeks. Current sentiment is still better as a result of the rebuff to the New Deal in the recent election. October, one large sales agency reports, was the best month since October last year, and was the first 30-day period in 1938 that the company was in the black. Up to Nov. 11, sales were exactly even with the same period in October, which gives this particular organization high hopes for better things next month and into the spring of 1939. The trade as a whole is looking forward eagerly to next spring, as present indications call for an almost certain period of good business at that time. The best customer at the moment in the Chicago district is the Rock Island arsenal, which probably will be in the market regularly for some time in the future. Small tool orders in October were 18 per cent ahead of September and this gain is being maintained this month.

Cincinnati Builders Report Easing Off in Orders

CINCINNATI—Bookings eased a bit over the preceding week, and throughout this area the appearance is one of hopeful waiting. Lathe ordering was off noticeably and with no compensating increase in other items the new business level descended. Approximate average ordering is about 40 per cent of capacity. Milling and grinding machinery, while still not at capacity demand, is most active and continues to be most spectacular in purchases. Inquiry for all types is steadily brisk and represents an apparent sincere and broad desire for retooling.

Increased Auto Schedules Boost Small Tool Sales

DETROIT—Because tooling requirements were underestimated at the Newcastle, Ind., plant which supplies Plymouth with its new coil spring front suspension systems, there is a hurried effort in Detroit to provide enough extra equipment and tools to increase production of these units from 2300 to 3200 sets a day. These additional parts will be manufactured in Detroit, but it is not clear whether the equipment will be set up in the Dodge plant here or in the plant of some outside supplier. Meanwhile, the

tide of optimism that is carrying auto production to record heights for the year, is steadily increasing the demand for small tools and perishable items in all the plants in the industry.

Much Better Feeling Expressed in the East

NEW YORK—The amount of business that was transacted in the past week was no real criterion of the real situation because of the two holidays, which many firms observed. A much better feeling is expressed in the trade as a result of the elections. However, it will probably be the first of the year before this feeling is translated into substantial increases in inquiries and orders. October was a good month for several of the larger dealers. What the November volume will be can hardly be guessed at since the month-end weeks are usually the most crucial around the metropolitan area. Government buying is still important, but there is undoubtedly a greater interest on the part of general industry, and orders are currently more diversified than they have been in some time, although the volume is relatively small. Small tool and cutter sales have shown marked gains, some New England manufacturers report.

. GREAT BRITAIN .

... U. K. steel output up 100,000 tons in October.

LONDON, Nov. 15.—Steel output in the United Kingdom during October rose 100,000 tons, being the greatest increase between September and October in 10 years. The increase is attributed, not so much to armaments as to the rapid liquidation of consumers' stocks and the expansion of commercial requirements. The full effects of the defense program are yet to mature.

There is moderate general pig iron and steel buying for delivery this year as consumers are awaiting 1939 price announcement, which now is rumored may not be made before December as examination of works costs is not yet

completed. Export sales are still restricted.

Markets on the Continent are generally quiet, though there is certain business with the Far East.

The International Thin Sheet Cartel left prices unchanged.

There is fair activity in the tin plate market with inquiry in excess of actual business as overseas consumers are looking for cheaper prices for next year. The bulk of the business is for prompt and early delivery. Unfilled orders are a trifle under 2,500,000 base boxes.

The motor car demand for black sheets is broadening, but export sales are still difficult.

Galvanized sheet export is negligible, and home demand is increasing slowly on defense orders.

British price on ferromanganese for export is £17 nominal.

GERMANY

... New all-time record for steel production achieved.

HAMBURG, (By Mail).—German steel production in August was 2,070,000 tons and in September 1,980,000. The daily production rate for iron and steel in September was a new all-time record.

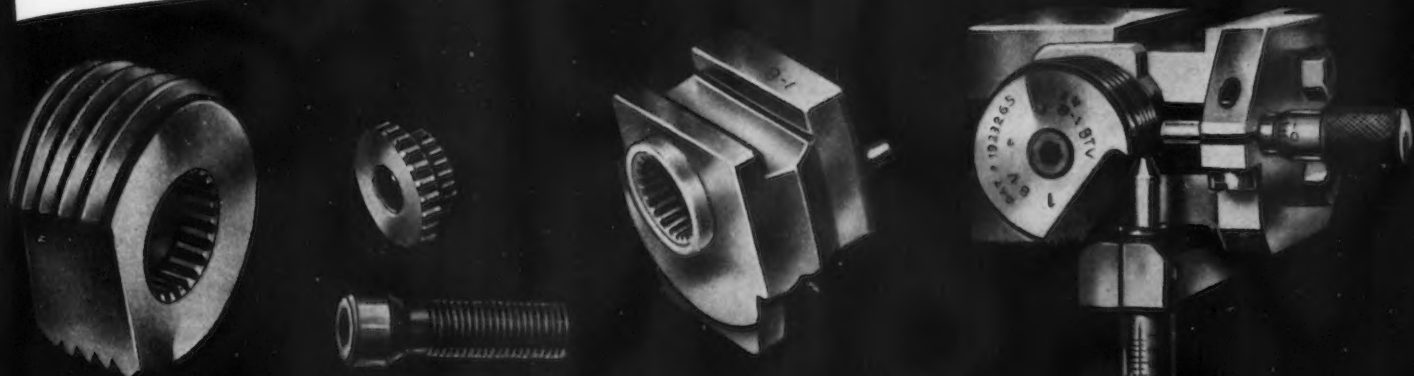
Germany is buying pig iron abroad, as the German production which is 16 per cent above same time last year, is still insufficient. Negotiations with America concerning a contract for 15,000 tons of foundry iron (the first in seven months) are still in progress.

The general trend of the steel export business is quite satisfactory. October brought a fair improvement for almost all iron and steel products. No price concessions are granted at present, except for black and galvanized sheets. The demand for all grades of machinery is also satisfactory.

Machine Tool Index Shows Slight Gain

THE index of machine tool orders on October stood at 118.1 compared with 117.4 in September, an increase in domestic business last month being offset by a somewhat lower volume of foreign orders, the National Machine Tool Builders' Association announced.

THESE DIFFERENCES stretch your *Threading* dollars



Namco circular chasers give more than 10 TIMES the life of ordinary kinds ... Serrated bushing allows chasers to be set ahead minimum amount for

each grind—vastly increasing chaser life ... Micrometer fixture checks grinds to insure identical working positions of all chaser cutting edges.

with NAMCO Circular Chaser Tools

Namco circular chasers are as rugged as heavy forming tools. They have annular thread grooves (without lead) ground to precision as fine as gages.

Heavy metal backs up their cutting edges ... external mounting dissipates heat ... frees chip quickly ... permits close to shoulder work.

Pilot and chaser blocks are one piece and blocks have six bearing surfaces in the ground die or tap body. The serrated bushings positively hold all chasers uniformly in relation to work.

Chaser settings as fine as .008" (or any multiple thereof) permit grinding off only enough to give a good cutting edge.

Namco micrometer fixture quickly checks all chaser grinds with blocks intact. Chasers are replaced in head with the certainty that they will cut threads identical with those cut before grinding.

These settings can be made in the tool room ... eliminating "cut and try" methods on the threading job ... turning many hours of idle time into profitable production.

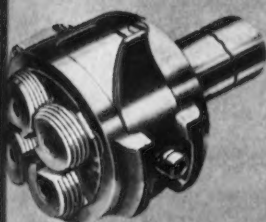
National Acme practical threading engineers are turning these differences into dollars in many a shop. Ask them to survey your needs and show you how much can be saved—before you buy. Or write the factory at 170 East 131st Street, Cleveland, Ohio.



Style DR, a favored die for production threading on Acme-Gridley and many other revolving spindle machines. Sizes .056-4 7/8"



Style DS, preferred for its uniformity and versatility for straight and straight threads on revolving spindle machines. Sizes 3/16-4 7/8"



Style DBS, continues to hang up new records on Brown & Sharp Automatics. Sizes .056-7/16"

NATIONAL ACME

ACME-GRIDLEY 4-6 AND 8 SPINDLE BAR AND CHUCKING AUTOMATICS • THE CHRONOLOG • POSITIVE CENTRIFUGE • SCREW MACHINE PRODUCTS • CONTRACT MANUFACTURING

Current Metal Working Activity

Latest Data Assembled by THE IRON AGE from Recognized Sources

	October 1938	September 1938	August 1938	September 1937	Nine Months 1937	Nine Months 1938
Steel Ingots: (gross tons)						
Monthly output ^a	3,117,934	2,657,748	2,546,988	4,289,507	42,482,597	18,005,938
Average weekly output ^a	703,823	620,969	574,941	1,002,221	1,089,297	461,691
Per cent of capacity ^a	52.45	46.28	42.85	76.30	83.09	34.41
Pig Iron: (gross tons)						
Monthly output ^b	2,052,284	1,680,435	1,493,995	3,410,371	30,221,640	12,249,241
Raw Materials:						
Coke output ^c (net tons)		2,730,789	2,544,571	4,679,875	41,736,671	22,716,018
Lake Ore consumed ^d (gross tons)		2,313,865	2,076,819	5,157,411	45,141,111	14,704,873
Castings: (net tons)						
Malleable, orders ^e		29,061	25,752	41,652	467,239	184,338
Steel, orders ^e		25,565	24,814	57,414	782,156	238,745
Finished Steel: (net tons)						
Trackwork shipments ^f		2,346	2,838	8,101	77,891	27,404
Fabricated shape orders ^g		89,828	102,539	132,432	1,334,469	769,621
Fabricated plate orders ^g		18,551	22,069	31,484	341,972	214,837
U. S. Steel Corp. shipments ^h		577,666	558,634	1,047,962	10,956,846	4,588,224
Fabricated Products:						
Automobile production ^b			96,936	175,620	3,954,480	
Construction contracts ⁱ		\$300,900†	\$313,141‡	\$207,072‡	\$2,307,014‡	\$2,148,112‡
Steel furniture shipments ^e		\$1,667‡	\$1,677‡	\$2,183‡	\$20,804‡	\$14,924‡
Steel boiler orders ^e (sq. ft.)		578,572	782,665	679,441	8,131,760	5,484,550
Locomotives ordered ^j	29	5	18	8	278	101
Freight cars ordered ^j	2,435	1,079	303	1,195	47,805	9,406
Machine tool index ^k		117.4	120.9	210.7	187.2†	109.3†
Foundry equipment index ^l		78.7	83.3	231.8	231.2†	79.1†
Exports: (gross tons)						
Total iron and steel ^m		346,068	242,139	543,707	5,862,237	3,767,585
All rolled and finished steel ^m		112,915	100,488	174,903	1,497,178	1,034,440
Scrap ^m		147,203	106,883	252,713	3,281,508	2,164,857
Imports: (gross tons)						
Total iron and steel ^m		27,958	20,041	37,071	443,186	181,712
Pig iron ^m		6,922	961	7,911	84,038	29,184
All rolled and finished steel ^m		10,349	13,691	12,037	224,433	116,660
British Production: (gross tons)						
Pig iron ⁿ	469,400	429,800	443,000	726,600	6,179,500	5,386,000
Steel ingots ⁿ	854,800	754,700	658,900	1,163,000	9,548,300	8,023,300

† Three months' average, ‡ 000 omitted.

Source of data: ^a American Iron and Steel Institute; ^b THE IRON AGE; ^c Bureau of Mines; ^d Lake Superior Iron Ore Association; ^e Bureau of the Census; ^f American Institute of Steel Construction; ^g United States Steel Corp.; ^h Preliminary figures from the Automobile Manufacturers Association—Final figures from Bureau of the Census, U. S. and Canada; ⁱ F. W. Dodge Corp.—37 Eastern states; ^j Railway Age; ^k National Machine Tool Builders Association; ^l Foundry Equipment Manufacturers Association; ^m Department of Commerce; ⁿ British Iron and Steel Federation.